Protocols, Analysis, and Reporting: Getting the Most from NHSN

Training Course

Protocols, Analysis, and Reporting: Getting the Most from National Healthcare Safety Network (NHSN):

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Protocols, Analysis, and Reporting: Getting the Most from National Healthcare Safety Network (NHSN):

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Day 3

Please place tab here with the number and title 1. Agenda. Agenda should be 1 per page and in **color.**

National Healthcare Safety Network Training Course
October 2-4, 2012
Centers for Disease Control and Prevention
Tom Harkin Global Communications Center
Tuesday, October 2, 2012

Time	Topic	Speaker
7:00 – 8:00	***Registration***	
8:00 – 8:15	Welcome	Teresa Horan Denise Cardo
8:15 – 8:45	NHSN: Changing Purposes	Dan Pollock
8:45 – 10:15	HAI Definition and CLABSI • Review CLABSI definition • Define key terms • Identify device-associated infections surveillance changes • Describe how to collect central line and patient day data	Kathy Allen-Bridson
10:15 – 10:45	***Break***	
10:45 – 12:45	Introduction to NHSN Analysis: A Focus on Device-associated (DA) Data • Discuss how to get started analyzing your data in NHSN • Illustrate basic modifications to standard reports • Interpret various measures used to analyze DA data.	Maggie Dudeck
12:45 – 1:30	***Lunch***	
1:30 – 2:30	CLABSI Case Studies: Audience Response	Kathy Allen-Bridson
2:30 – 3:45	HAI Definition and CAUTI • Review CAUTI definition • Define key terms • Describe how to collect urinary catheter and patient day data • Complete data collection forms	Janet Brooks
3:45 – 4:15	***Break***	
4:15 – 5:00	CAUTI Case Studies: Audience Response	Janet Brooks
5:00	***Wrap up***	Teresa Horan

NHSN
National Healthcare Safety Network

National Healthcare Safety Network Training Course
October 2—4, 2012
Centers for Disease Control and Prevention
Tom Harkin Global Communications Center
Wednesday, October 3, 2012

Time	Topic	Speaker
7:00 – 8:00	**Registration**	
8:00 – 10:00	Advanced Analysis: Focus on SSI Data • Demonstrate the use of advanced analysis reports and functionalities within NHSN • Review the standardized infection ratio and its use in the interpretation of SSI data	Maggie Dudeck
10:00 – 10:30	***Break***	
10:30 – 12:30	SSI Surveillance • Review SSI protocol • Define key terms • Complete the Denominator for Procedure Form • Importing procedure records • Linking procedure and SSI records	Teresa Horan
12:30 – 1:15	***Lunch***	
1:15 – 2:15	SSI Surveillance (continued) • Review definitions of SSI • Complete the SSI form	Gloria Morrell
2:15 – 3:00	Internal Validation	Katie Arnold
3:00 – 3:30	***Break***	
3:30 – 4:45	SSI Case Studies: Audience Response	Teresa Horan Gloria Morrell
4:45	**Wrap Up**	Teresa Horan

NHSN
National Healthcare Safety Network

National Healthcare Safety Network Training Course
October 2—4, 2012
Centers for Disease Control and Prevention
Tom Harkin Global Communications Center
Thursday, October 4, 2012

Time	Topic	Speaker
7:00 – 8:00	Registration	
8:00– 9:30	MRSA Bacteremia and CDI LabID Event Reporting • Review requirements for MRSA and CDI LabID Event reporting to CMS via NHSN • Review MRSA and CDI LabID definitions and protocol • Define key terms • Describe how to correctly enter MRSA and CDI LabID Events into NHSN	Angela Anttila
9:30 – 10:00	***Break***	
10:00 – 11:00	MRSA Bacteremia and CDI LabID Event Case Studies: Audience Response	Angela Anttila
11:00 – 11:30	Location Mapping	Maggie Dudeck
11:30 – 12:15	***Lunch***	
12:15 – 1:45	Ventilator-Associated Events • Review protocol, definition, and criteria for ventilator associated events (VAE) • Define key terms • Recognize the method to identify denominators for VAE rate calculations	Shelley Magill
1:45 – 2:45	VAE Case Studies: Audience Response	Cindy Gross
2:45 – 3:00	**Break**	
3:00 – 3:45	Keeping the Public's Trust: How to Communicate about NHSN Data and HAI Prevention	Abbigail Tumpey
3:45	Wrap Up and Course Evaluation	Teresa Horan

Please place tab here with the number and title 2. Welcome and Learning Objectives Review. Presentation should be double sided, black and white, and 2 slides per page.

Protocols, Analysis, and Reporting: Getting the Most from NHSN Training Course

Division of Healthcare Quality Promotion

Continuing Education

- **SP2153EV: Protocols, Analysis, and Reporting: Getting the Most from NHSN**
- **Continuing Medical Education for Physicians (CME):**
  - The Centers for Disease Control and Prevention is accredited by the Accreditation Council for Continuing Medical Education (ACCME®) to provide continuing medical education for physicians.
  - The Centers for Disease Control and Prevention designates this live training for a maximum of (20.5) *AMA PRA Category 1 Credits*™. Physicians should only claim credit commensurate with the extent of their participation in the activity.
- **Continuing Education designated for Non-Physicians:**
  - Non-physicians will receive a certificate of participation.

Continuing Education (continued)

- **Continuing Nursing Education for Nurses (CNE):**
  - The Centers for Disease Control and Prevention is accredited as a provider of Continuing Nursing Education by the American Nurses Credentialing Center's Commission on Accreditation.
  - This activity provides **(20.5)** contact hours.

- **IACET Continuing Education Units (CEU):**
  - The CDC has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. The CDC is authorized by IACET to offer **(2.1)** ANSI/IACET CEU's for this program.

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Learning Objectives for NHSN Training

- Review protocol, definition, key terms, and criteria for central line-associated bloodstream infection (CLABSI)
- Review requirements for CLABSI reporting to CMS through the National Healthcare Safety Network (NHSN)
- Recognize the method to identify denominators for CLABSI rate calculations
- Accurately apply the CDC/NHSN definitions and criteria to example case scenarios for CLABSI

Learning Objectives for NHSN Training (continued)

- Apply statistical methods in the interpretation of rates and SIR comparisons for CAUTI and CLABSI, and understand methods behind statistical measures used in the NHSN and for the CMS Hospital Inpatient Quality Reporting Program
- Correctly apply NHSN analytical functions to case scenarios to illustrate analysis features and identify problems and successes within a reporting facility
- Understand how various metrics obtained from NHSN can be interpreted and used to drive prevention of HAIs

Learning Objectives for NHSN Training (continued)

- Review protocol, definition, key terms, and criteria for catheter-associated urinary tract infection (CAUTI)
- Review requirements for CAUTI reporting to CMS through NHSN
- Recognize the method to identify denominators for CAUTI rate calculations
- Accurately apply the CDC/NHSN definitions and criteria to example case scenarios for CAUTI

Learning Objectives for NHSN Training (continued)

- Apply statistical methods in the interpretation of rates and SIR comparisons for SSIs, and understand methods behind statistical measures used in the NHSN and for the CMS Hospital Inpatient Quality Reporting Program
- Correctly apply NHSN analytical functions to case scenarios to illustrate analysis features and identify problems and successes within a reporting facility
- Understand how various metrics obtained from NHSN can be interpreted and used to drive prevention of HAIs

Learning Objectives for NHSN Training (continued)

- Review protocol, definition, key terms, and criteria for surgical site infection (SSI)
- Review requirements for SSI reporting to CMS through NHSN
- Demonstrate how to link an SSI event to a procedure record and how to import procedure records
- Recognize the method to identify denominators for SSI rate calculations
- Accurately apply the CDC/NHSN definitions and criteria to example case scenarios for SSI

Learning Objectives for NHSN Training (continued)

- Review protocol, definition, key terms, and criteria for LabID Event reporting for MRSA Bacteremia and CDI
- Review requirements for LabID Event reporting for MRSA Bacteremia and CDI to CMS through NHSN
- Describe how to correctly enter LabID Events for MRSA Bacteremia and CDI into NHSN
- Accurately apply the CDC/NHSN definitions and criteria to example case scenarios for LabID Events for MRSA Bacteremia and CDI

Learning Objectives for NHSN Training (continued)

- Review protocol, definition, key terms, and criteria for ventilator –associated events (VAE)
- Recognize the method to identify denominators for VAE rate calculations
- Accurately apply the CDC/NHSN definitions and criteria to example case scenarios for VAE

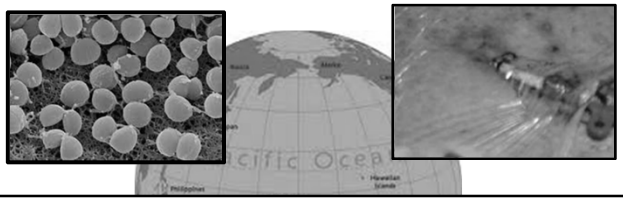
Please place tab here with the number and title 3. NHSN: Changing Purposes.
Presentation should be double sided, black and white, and 2 slides per page.

NHSN:
Changing Purposes

Daniel A. Pollock, M.D.
Surveillance Branch Chief
Division of Healthcare Quality Promotion
National Center for Emerging and Zoonotic Infectious Diseases

Protocols, Analysis and Reporting: Getting the Most from NHSN
October 2-4, 2012
Centers for Disease Control and Prevention
Atlanta, Georgia

HAI Surveillance: The Global Environment



"Significant changes have been occurring in the field of HAIs, which have now become a public issue. Infections are better known and understood by the medical community. Countries have developed various policies to prevent HAIs, relying on a wide array of tools and procedures. Among these, the publication of HAI rates is important, both to increase awareness on the part of decision-makers and to measure the efficacy of recommendations"

*Marcel J-P, et al. Healthcare-associated infections: Think globally, act locally. *Clin Microbiol Infect* 2008;14:895-907

Healthcare -Associated Infection (HAI) Surveillance: The U.S. Environment

Assumption - The advent of public reporting and the adoption of data-driven performance incentives as tools for influencing healthcare quality transform the question of whether HAIs will be included as a publicly reported metric in pay-for-performance programs to when and how HAIs will be included

What is at stake - Policymakers and payers are choosing between two HAI surveillance strategies:

(1) Individuals specially trained in case detection use the entire medical record and other data sources to identify HAIs

(2) Individuals trained to use discharge data from claims or administrative records to identify healthcare outcomes that are defined as HAIs

Bottom line - For HAIs, surveillance strategy (1) has gained favor over (2) but this preference is by no means permanent

Defining Terms

Public reporting - Public disclosure of practitioner or healthcare facility performance measurements with the intention of improving transparency and accountability in healthcare or motivating improvements in quality

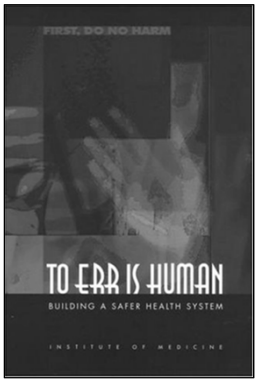
Pay for reporting – Financially rewarding practitioners or healthcare facilities for collecting and submitting performance data to a quality measurement program

Pay for Performance – Financially rewarding practitioners or healthcare facilities for scoring well on performance measurements

A Short History of Public Reporting, Pay for Reporting, and Pay for Performance in the U.S.

1986 – Health Care Financing Administration (HCFA), now known as the Centers for Medicare and Medicaid Services (CMS), publicly reports Medicare inpatient mortality rates
1987 – U.S. Healthcare, now known as Aetna, initiates large-scale use of pay-for-performance for primary care physicians
Early 1990s – Several states publicly report mortality rates for hospitals performing cardiac surgery
2002 – National Quality Forum (NQF) issues its first quality measure specifications for use in public reporting programs
2003 – CMS launches pay-for-performance demonstration project
2005 – CMS initiates pay for reporting and publicly reports hospital process-based measures at the Hospital Compare website
2005 – Pennsylvania publicly reports hospital HAI data
2010 – Affordable Care Act establishes a pay-for-performance program for hospitals to begin in 2013

Policy Shift in Patient Safety and Quality of Care: From Publicly Reporting Serious Adverse Events to Broad Use of Report Cards for Payment Purposes



November 1999

March 2010

Hospital Value Based Purchasing, HAIs, and Patient Protection and Affordable Care Act - 2010

TITLE III—IMPROVING THE QUALITY AND EFFICIENCY OF HEALTH CARE

Subtitle A—Transforming the Health Care Delivery System

PART I—LINKING PAYMENT TO QUALITY OUTCOMES UNDER THE MEDICARE PROGRAM

SEC. 3001. HOSPITAL VALUE-BASED PURCHASING PROGRAM.

(a) PROGRAM.—

(1) IN GENERAL.—Section 1886 of the Social Security Act (42 U.S.C. 1395ww), as amended by section 4102(a) of the HITECH Act (Public Law 111–5), is amended by adding at the end the following new subsection:

"(o) HOSPITAL VALUE-BASED PURCHASING PROGRAM.—

"(1) ESTABLISHMENT.—

Healthcare-associated infections reporting is included in Section 3001- Hospital Value Based Purchasing Program

"(2) MEASURES.—

"(A) IN GENERAL.—The Secretary shall select measures for purposes of the Program. Such measures shall be selected from the measures specified under subsection (b)(3)(B)(viii).

"(B) REQUIREMENTS.—

"(i) FOR FISCAL YEAR 2013.—For value-based incentive payments made with respect to discharges occurring during fiscal year 2013, the Secretary shall ensure the following:

"(I) CONDITIONS OR PROCEDURES.—Measures are selected under subparagraph (A) that cover at least the following 5 specific conditions or procedures:

"(aa) Acute myocardial infarction (AMI).

"(bb) Heart failure.

"(cc) Pneumonia.

"(dd) Surgeries, as measured by the Surgical Care Improvement Project (formerly referred to as 'Surgical Infection Prevention' for discharges occurring before July 2006).

"(ee) Healthcare-associated infections, as measured by the prevention metrics and targets established in the HHS Action Plan to Prevent Healthcare-Associated Infections (or any successor plan) of the Department of Health and Human Services.

"(II) HCAHPS.—Measures selected under subparagraph (A) shall be related to the Hospital

HHS Action Plan Metrics – Appendix G

	Infection or care process	System	Metric
1	Central line-associated bloodstream infection	NHSN	Standardized infection ratio
2	Adherence to central line insertion practices	NHSN	Percentage adherence
3a	Hospitalizations with *Clostridium difficile*	Hospital discharge data	Hospitalizations per 1000 patient discharges
3b	*Clostrium difficile* laboratory identified event	NHSN	Standardized infection ratio
4	Catheter-associated UTI	NHSN	Standardized infection ratio
5a	Methicillin resistant *Staphylococcus aureus*	Emerging Infections Program	Incidence rate
5b	MRSA bacteremia	NHSN	Standardized infection ratio
6	Surgical site infection	NHSN	Standardized infection ratio
7	Adherence to Surgical Care Improvement Program	QualityNet	Percentage adherence

CDC's Surveillance System for Healthcare-Associated infections (HAIs)

- State and federal requirements account for growth from ~ 300 hospitals in 2005 to > 4900 hospitals in 2012
- HAI data includes numerators and denominators; outcomes are risk adjusted; and HAI measures are endorsed by the National Quality Forum (NQF)
- Data are used for internal quality improvement, required external reporting, and national surveillance
- System has been adopted for use by 29 states and Washington, D.C. for HAI reporting mandates and by CMS for pay-for- reporting programs and value based purchasing
- Technical design enables manual data entry or electronic reporting via an industry-standard file format

NHSN Quality Measures for Hospitals – Status of National Quality Forum (NQF) Endorsement

	Measure	NQF Status
1	Central line-associated bloodstream infections (CLABSIs)	Endorsed
2	Catheter-associated urinary tract infections (CAUTIs)	Endorsed
3	Surgical site infections (SSIs)	Endorsed
4	Healthcare worker influenza vaccination coverage	Endorsed
5	*Clostridum difficile* laboratory identified events	Proposed
6	MRSA Bacteremia laboratory identified events	Proposed

Use of the NHSN Patient Safety Component is Mandated in 29 States and the District of Columbia

2006	2007	2008	2009	2010	2011	2012
VT	NY SC CO	CT TN DE PA OK MA VA WA CA MD	IL OR NH NJ WV	NV DC	AL TX UT AR	HI ME NC IN NM

Central line-associated bloodstream infections (CLABSIs)	AL, AR, CA, CO, CT, DC, DE, HI, IL, IN, MA, MD, NC, NH, NJ, NM, NV, NY, OK, OR, PA, SC, TN,TX, UT, VA, VT, WA, WV
Surgical site infections (SSIs)	AL, AR, CA, CO, CT, DE, HI, IL, IN, MA, MD, NC, NH, NJ, NV, NY, OR, PA, SC, TN, TX, VT, WA, WV
Catheter-associated urinary tract infections (CAUTIs)	AL, AR, CT, DE, IN, NC, NH, NJ, PA, TN, UT, WV
Multidrug-resistant organisms and *Clostridium difficile* infections	CA, DC, IL, ME, NJ, NM, NV, NY, OR, PA, TN UT
Ventilator-associated pneumonias (VAPs)	OK, PA, WA
Central line insertion practices (CLIP)	CA, NH
Dialysis events	CO, HI, TN

7-20-2012

Hospital Reporting to CMS via NHSN – Current and Proposed Requirements

Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon surgery and abdominal hysterectomy	January 2012
CLABSI	Long Term Care Hospitals *	October 2012
CAUTI	Long Term Care Hospitals *	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA Bacteremia LabID Event	Acute Care Hospitals	January 2013
C. difficile LabID Event	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
SSI and other outcomes	Ambulatory Surgery Centers and Hospital Outpatient Departments	TBD

* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN

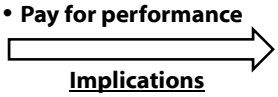
HAI Surveillance in the Current U.S. Environment and the Implications for NHSN

NHSN at Launch - 2005
~ 300 hospitals

1. Purely voluntary and confidential system
2. Healthcare facilities initially enrolled had all participated in legacy CDC system(s)
3. Primary motivation for facilities is internal quality of care improvement
4. Expectation that facilities are motivated to submit data to CDC that are high quality and complete

Environment

- **Public reporting**
- **Pay for reporting**
- **Pay for performance**



Implications

- **Changes in NHSN's purposes, infrastructure, and operations**
- **New scrutiny of HAI case criteria and reporting requirements**
- **Increasing emphasis on data validation**
- **Pressure to simplify HAI definitions and data requirements and move to electronic HAI detection and reporting**

NHSN at Age 7 - 2012
> 4900 hospitals

1. Predominantly mandatory and public reporting system
2. Vast majority of healthcare facilities enrolled had not participated in legacy CDC system(s)
3. Primary motivation for facilities is compliance with reporting requirements
4. Uncertainties about quality and completeness of data submitted to CDC

Implications of Public Reporting, Pay for Reporting, and Pay for Performance for NHSN

Changes in NHSN's purposes, infrastructure, and operations

> Revision of NHSN Agreement to Participate and Consent Form
> Enhanced infrastructure to improve system performance
> New operational capabilities for reporting to states and CMS

New scrutiny of HAI case criteria and reporting requirements

> Concerns that some case criteria lead to misclassification and some data requirements go beyond quality measurements

Increasing emphasis on data validation

> Assistance to states and CMS for their validation programs

Pressure to simplify HAI definitions and data requirements and move to electronic HAI detection and reporting

> Revise definitions in ways that reduce complexity, maintain clinical relevance, and avoid potential case misclassification
> Accelerate use of computer-based detection algorithms and use of electronic healthcare data for HAI surveillance purposes

Healthcare Report Cards and New Payment Policies: Catalyst for Change or Cause for Concern?

Positive change in clinical performance is most likely to occur if quality measurement data is:

- Actionable
- Reliable
- Robust to criticism from hospitals and care teams being assessed
- Understood in broad terms by the public and policymakers

Concerns are most likely to be allayed by safeguards against:

- Unacceptably burdensome reporting requirements
- Gaming the data by providers
- Inappropriate focus on what is measured and incentivized at the expense of other important aspects of healthcare
- Distortions of clinical priorities or practices

Summing Up

- HAI public reporting, pay for reporting, and pay for performance programs are part of a larger trend toward more transparency and accountability in healthcare
- CDC's NHSN has emerged as the primary surveillance system used for HAI reporting mandates at the state and federal levels
- For NHSN, the main opportunities and challenges are to meet the rising expectations for HAI reporting in ways that maximize benefits for patient care and public health while mitigating risks of unintended, adverse consequences

Thank You!

Please contact me at dpollock@cdc.gov

For More Information about NHSN:
http://www.cdc.gov/nhsn/

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Please place tab here with the number and title 4. HAI Definition and CLABSI.
Presentation should be double sided, black and white, and 2 slides per page.

Using the National Healthcare Safety Network for CLABSI Surveillance

Katherine Allen-Bridson, RN, BSN, MScPH, CIC
Centers for Disease Control and Prevention

October 2012

Nothing to Disclose

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Objectives

1. **Identify requirements for CLABSI reporting to CMS through the National Healthcare Safety Network (NHSN)**
2. **Identify the protocol, definitions, and criteria for central line-associated bloodstream infections (CLABSI) including the new criteria for Mucosal Barrier Injury-Laboratory Confirmed Bloodstream Infection (MBI-LCBI).**
3. **State the correct definitions of new Key Terms for healthcare-associated and device-associated infections.**
4. **State the method to correctly identify central line days in different types of facility locations.**

2

CLABSI Epidemiology

- In United States (US): 15 million central vascular catheter days occur in ICUs each year.
- Estimated 250,000 CLABSI cases if whole hospital assessed annually.
- 80,000 CLABSI in ICUs annually
- Increased length of stay and morbidity
- Cost varies: $3,700 to $29,000/episode

O'Grady NP, Alexander M, et al. Guidelines for the prevention of intravascular catheter-related infections, 2011. HIPAC; US Department of Health and Human Services. http://www.cdc.gov/hicpac/BSI/BSI-guidelines-2011.html

Marschall J. Mermel LA et al Strategies to prevent central line-associated bloodstream infections in Acute Care hospitals. Infect Control Hosp Epidemiol2008; S22-S30.

3

CMS Reporting via NHSN – Current

HAI Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and Abdominal Hysterectomy	January 2012
I.V. antimicrobial start	Dialysis Facilities	January 2012
Positive blood culture	Dialysis Facilities	January 2012
Signs of vascular access infection	Dialysis Facilities	January 2012
CLABSI	Long Term Care Hospitals *	October 2012
CAUTI	Long Term Care Hospitals *	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA Bacteremia	Acute Care Hospitals	January 2013
C. difficile LabID Event	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	ASCs	October 2014
SSI *(TBD)*	Outpatient Surgery/ASCs	TBD

* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN

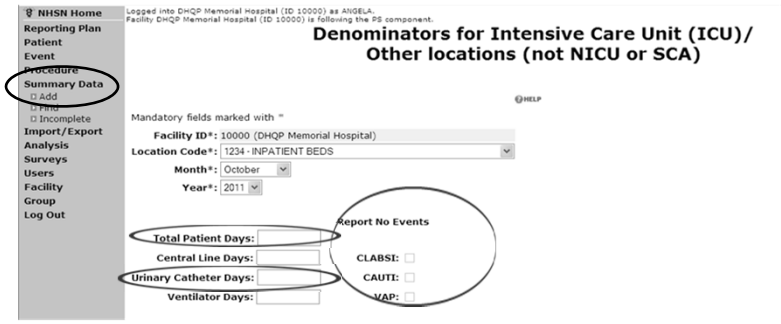
Centers for Medicare and Medicaid Services Inpatient Prospective Payment System (CMS IPPS)

- **Facilities participating in the Hospital Quality Reporting Program must submit the data quarterly, whether or not they have central-line days.**
- **Acute care facilities that do not have ICU beds currently are not required to enroll in the NHSN but must sign a waiver. Check with state QIO.**
- **For more on the IPPS requirements visit http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY-2012-IPPS-Final-Rule-Home-Page.html**
- **For information on training and enrollment requirements for NHSN visit www.cdc.gov/nhsn/cms-ipps-rule_training.html**

5

Reporting Numerator and Denominator Data

- CMS reportable data MUST be included in monthly reporting plans.
- Report each CLABSI detected or indicate that no CLABSI occurred for reporting locations. **(Found on Denominator screen).**
- Report total device days and total patient days for reporting locations, including months in which no CLABSIs were identified and/or no patient days or central line days occurred.



NHSN and CMS

- Data must be reported to NHSN by means of manual data entry into NHSN web-based application or via file imports using the Clinical Document Architecture (CDA) file format.
- Data must be submitted monthly (within 30 days of the end of the month in which it is collected) so it has the greatest impact on infection prevention activities.
- For data to be shared with CMS, each quarter's data must be entered into NHSN no later than 4 ½ months after the end of the quarter.
- E.g. Q1 (January-March) data must be entered into NHSN by August 15; Q2 by November 15; Q 3 by February 15 and Q4 by May 15 (frozen @00:00 on 16th).

NHSN and CMS

- CLABSI data submitted to NHSN by HQRP hospitals that completed Annual Payment Update (APU) pledges as well as LTACs will be reported by CDC to CMS.
- CDC will provide the following hospital specific data:
  - number of observed CLABSIs
  - number of expected CLABSIs calculated using NHSN database
  - number of central line days
  - hospital-specific CLABSI standardized infection ratio (SIR)
  - 95% CI

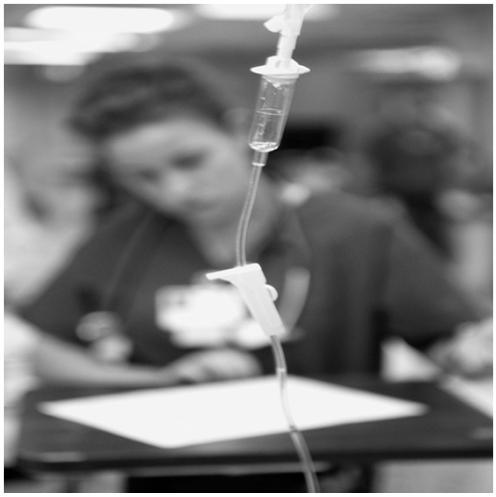
http://www.cdc.gov/nhsn/PDFs/FINAL-ACH-CAUTI-Guidance.pdf

NHSN and CMS

- Hospitals can view their own HAI summary statistics at a secure CMS website where the APU Dashboard is posted (for more information see http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetBasic&cid=1228694346716) .

NHSN and CMS
Long Term Acute Care Facilities

- Each LTAC with a separate CCN number must enroll in NHSN as a separate facility.
- Map each of their inpatient locations to the appropriate CDC-defined location type (see Chapter 15 of NHSN manual).
- All other operational guidelines described with Acute Care guidance.



CLABSI Prevention and Control begins with thorough surveillance and quality data!!!

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Surveillance Methodology

CLABSI Surveillance requires:

- Active
- Prospective
- Priority-directed surveillance that will yield risk-adjusted incidence rates

12

Consistency is a Must!

- Surveillance criteria is designed to look at a population at risk
- Identify patients meeting the criteria
- Consistently apply the criteria
- Ensures the comparability of the data-- protects your facility and others

13

What If There is Clinical Disagreement?

- Surveillance vs. clinical definitions
  - Different purposes: population/trends/prevention vs. individual/diagnosis/treatment
  - May not agree
  - Comments section useful to note important factors

Surveillance determination "TRUMPS" clinical determination

- Can submit questions to nhsn@cdc.gov

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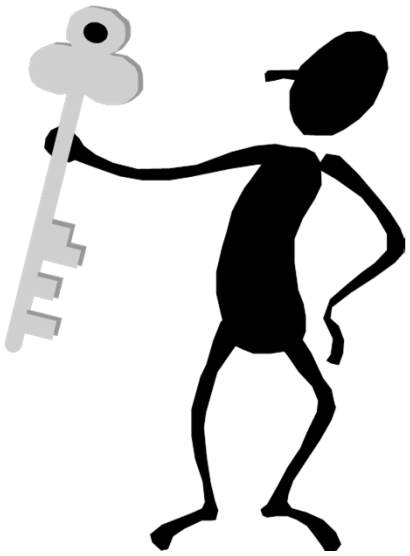
Key Terms



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Investigating an Infection

Ask yourself questions in this order:
1. Is it POA or an HAI? If POA, stop.
2. If an HAI, which site-specific criterion is met?
3. Is this a device-associated HAI?
4. Attributable to what location/facility/procedure?

Depending on the specifics of your surveillance, i.e., only device-associated, only certain locations, the order may differ.

Key Terms

Present on Admission (POA)	An infection is considered POA if it occurs on the day of admission to the hospital or the next day and fully meets a CDC/NHSN site-specific infection criterion.
Healthcare-associated Infection (HAI)	An infection is considered an HAI if it occurs on or after the 3rd hospital day and meets a CDC/NHSN site-specific infection criterion. The onset of the HAI may occur during the initial 2-day period of hospitalization as long as the infection criterion is not fully met during that period.
Device-associated Infection	An infection is considered device-associated if the device has been in place for > 2 calendar days and meets a CDC/NHSN site-specific infection criterion. The onset of the infection may occur during the initial 2-day period of device placement as long as the infection criterion is not fully met during that period. Infections occurring on Day 1 or 2 following device discontinuation, with day of discontinuation = Day 1, are device-associated infections.
Onset of Infection	The onset of infection is the date when the first sign or symptom of infection (clinical evidence) appeared or the date the specimen used to meet the infection criterion was collected, whichever came first. Synonyms: infection date, infection onset, onset date, date of event
Transfer Rule	If an HAI develops ≤ 2 calendar days of transfer from one inpatient location to another in the same facility, it is attributed to the transferring location (i.e., it occurs on the day of transfer or the next day). Likewise, if an HAI develops ≤ 2 calendar days of transfer from one inpatient facility to another, it is attributed to the transferring facility. Receiving facilities should share information about such HAIs with the transferring facility to enable reporting. Day of transfer = Day 1

Key Terms	Day 1	Day 2	Day 3	Day 4	Infection is…
POA	Admit from ED to ICU	ICU Infection criterion fully met			POA
HAI	Direct admit to ICU	ICU	ICU Infection criterion fully met		HAI attributable to ICU
HAI	Admit from ED to ICU	ICU Infection onset	ICU Infection criterion fully met		HAI attributable to ICU
Device Associated	Device inserted	Device in place	Device in place Infection criterion fully met		Device associated
Device Associated	Device inserted	Device in place Infection criterion fully met			Not device associated
Device Associated	Device inserted	Device in place Infection onset	Device in place Infection criterion fully met		Device associated
Device Associated	Device inserted	Device in place part of day only	No device in place	Infection onset	Not device associated
Device Associated	Device inserted	Device in place part of day only	Infection criterion fully met		Device associated
Transfer Rule	ICU ► 3W	3W Infection criteria met	3W		Attributable to ICU
Transfer Rule	ICU ► 3W	3W	3W Infection onset		Attributable to 3W
Transfer Rule	3W ► Home	Home Infection criterion fully met	Home		Attributable to 3W

Healthcare Associated Infection (HAI) vs. Present on Admission (POA)

- POA: An infection is considered POA if it occurs on the day of admission to the hospital or the next day. The infection must meet **all** of a CDC/NHSN specific-site infection criterion prior to the 3rd hospital day to be considered POA.
- HAI: An infection is considered an HAI if it occurs on or after the 3rd hospital day and meets a CDC/NHSN site-specific infection criterion. The onset of the HAI may occur during the initial 2-day period of hospitalization as long as the infection criterion is not fully met during that period.

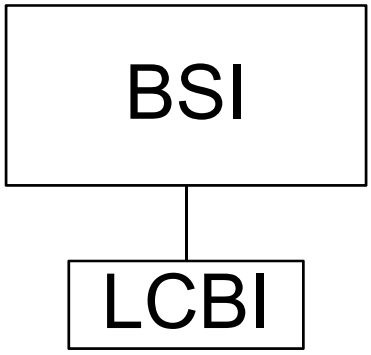
HAI vs. POA

2-Day Rules	Day 1	Day 2	Day 3	Day 4	
HAI	Admit from ED to ICU	ICU Infection criterion fully met	ICU		POA
HAI	Direct Admit to ICU	ICU	ICU Infection onset		HAI attributable to ICU
HAI	Direct Admit to 4W	4W Component of criterion met	4W infection criterion fully met		HAI attributable to 4W*

* In these rare situations, record the date of onset as the date of hospital day 3.

Central Line-associated Bloodstream Infection (CLABSI)

- CLABSI surveillance utilizes the Major Event Type: BSI
- Specific Event Type: Laboratory Confirmed Bloodstream Infection (LCBI)



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Key Term: Onset of Infection a.k.a. Infection Onset a.k.a. Date of Event

- The date when the first signs or symptoms of infection (clinical evidence) appeared, or the date the specimen used to meet the infection criterion was collected, whichever came first.

Key Term: Central Line-associated Bloodstream Infection (CLABSI)

Central line-associated BSI: An LCBI where a central line or umbilical catheter was in place for >2 calendar days, with day of device placement being Day 1,
and
a central or umbilical catheter was in place on the date of event or the day before. If admitted or transferred into a facility with a central line in place (e.g., tunneled or implanted central line), day of first access is considered Day1.

i.e. Device-association Rule

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Device-associated Rule

- An infection is considered device-associated if the device has been in place for > 2 calendar days and meets a CDC/NHSN site-specific infection criterion. The onset of the infection may occur during the initial 2-day period of device placement as long as the infection criterion is not fully met during that period. Infections occurring on Day 1 or 2 following device discontinuation, with day of discontinuation = Day 1, are device-associated infections.

Device-association

Key Terms	Day 1	Day 2	Day 3	Day 4	
Device-association Rule	Device Inserted	Device in place	Device in place Component of criterion met	Device in place Infection criterion met	Device-associated
Device-association Rule	Device Inserted	Device removed	Component of criterion met	Infection criterion met	Not Device-associated
Device-association Rule	Device Inserted	Device in place Component of criterion met	Device in place Infection criterion fully met	Device removed	Device-associated
Device-association Rule	Device Inserted	Device removed	No device in place	Component of criterion met	Not Device-associated
Device-association Rule	Device Inserted	Device in place Infection Criterion met	Device in place	Device in place	Not Device-associated

Key Term: Central Line

- **An intravascular catheter that terminates at or close to the heart or in one of the <u>great vessels</u> which is used for infusion, withdrawal of blood, or hemodynamic monitoring. The following are considered great vessels for the purpose of reporting central-line BSI:**

- Aorta
- Pulmonary arteries
- Superior vena cava
- Inferior vena cava
- Brachiocephalic veins
- Internal jugular veins
- Subclavian veins
- External iliac veins
- Common iliac veins
- Femoral veins
- Umbilical artery and vein (in neonates)

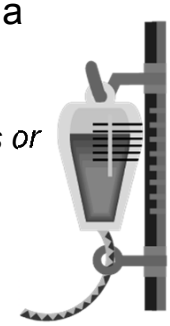
Note: Femoral ARTERIES are not great vessels

Key Term: Infusion

Infusion: Introduction of a solution through a catheter lumen into a blood vessel

Includes:

- *Continuous infusions such as nutritious fluids or medications,*
- *Intermittent infusions such as flushes or IV antimicrobial administration,*
- *Administration of blood or blood products in the case of transfusion or hemodialysis*



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Central Line Notes

- **An introducer is considered an intravascular catheter, and depending on the location of its tip, may be a central line.**
- **Pacemaker wires and other non-lumened devices inserted into central blood vessels or the heart are <u>not</u> considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.**
- **The following devices are <u>not</u> considered central lines: extracorporeal membrane oxygenation (ECMO), femoral arterial catheters and intraaortic balloon pump (IABP) devices.**
- ***If you have a question about whether a device qualifies as a central line, please email us at <u>NHSN@cdc.gov</u>.***

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Key Terms: Location of Attribution and Transfer Rule

- **Location of Attribution: The inpatient location where the patient was assigned on the date of the BSI event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first. See Transfer Rule exception below.**

Exception to Location of Attribution = Transfer Rule

- **Transfer Rule: If a CLABSI develops ≤ 2 calendar days of transfer from one inpatient location to another in the same facility or a new facility, the infection is attributed to the transferring location or facility (i.e. it occurs on day of transfer or the next day); day of transfer is Day 1.**

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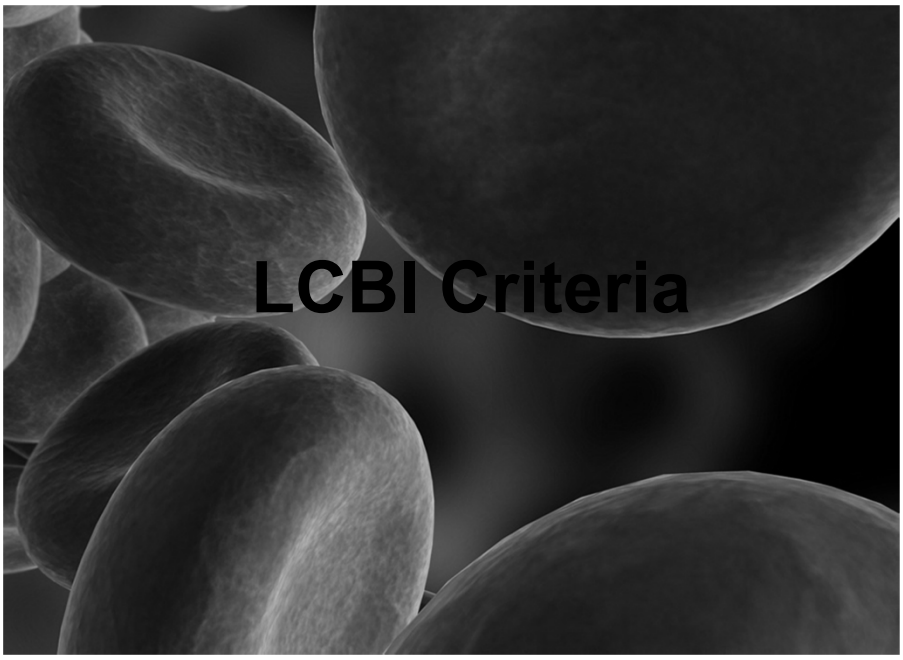
Transfer Rule

2-Day Rules	Day 1	Day 2	Day 3	Day 4	
Transfer Rule	Direct admit from Hospital A's ICU ► Hospital B's ICU	Hospital B ICU Infection criterion met	Hospital B ICU	Hospital B ICU	Attributable to Hospital A ICU
Transfer Rule	ICU ► 3W	3W Component of infection criterion met	3W Infection criterion met	3W	Attributable to 3W
Transfer Rule	3W ► Home	Home Infection criterion met	Home		Attributable to 3W

Exception to Transfer Rule

- Locations which do not house patients overnight (e.g. Emergency Department or Operating Room) will have no denominator data (i.e. patient days or central line days). Therefore, CLABSIs cannot be attributed to these locations. Instead, the CLABSI must be attributed to the next location in which the patient stays

Chapter 4 of January 2013 NHSN PSC Manual, CLABSI Event , page 4-3 and 4-4.



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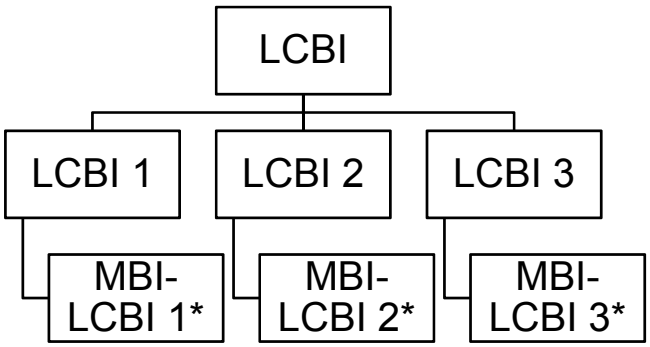
Laboratory Confirmed Bloodstream Infection Criteria



*Patients meeting both an MBI-LCBI criterion and an LCBI criterion should only be reported as an MBI-LCBI.

LCBI – Criterion 1

- Patient has a recognized pathogen cultured from one or more blood cultures

And

- Organism cultured from blood is not related to an infection at another site.

Example: Jon Smith had a PICC line inserted on admission (June 1). On hospital day 4, he became confused and experienced chills. Blood cultures were drawn which grew E. faecalis.

Mr. Smith meets the criteria for LCBI Criterion 1.

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Key Term: Primary BSI (a.k.a. "not related to an infection at another site")

- A Primary BSI is identified by ruling out all non-blood sites as the source of the bloodstream infection.
- A BSI that is associated with an infection at another site is referred to as a Secondary BSI and never reported as an LCBI or CLABSI.

Secondary BSI

- A culture-confirmed BSI associated with a documented HAI at another site
- Primary infection must meet one of the CDC/NHSN infection definitions (Chapter 17)
- BSI and other site must be related with
  - At least one matching organism by genus and species
  - If no culture of primary site, then BSI organism must be logical for the primary site

Appendix 1. Secondary Bloodstream Infection (BSI) Guide*

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

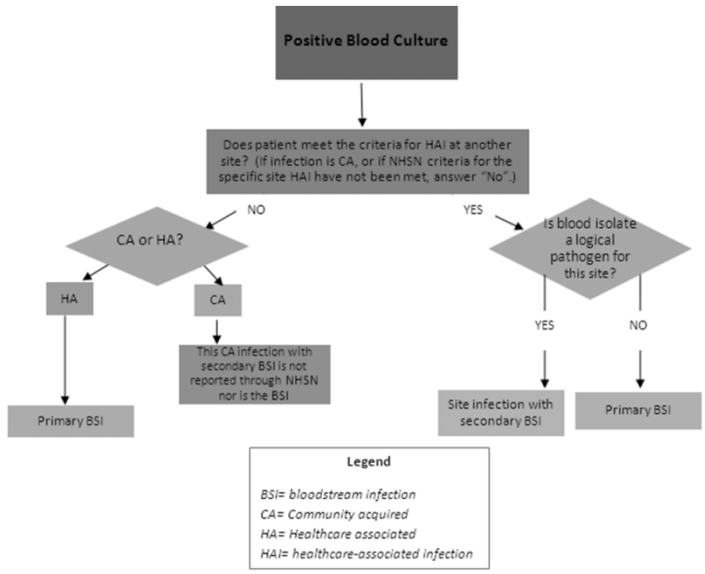
- "…where a culture of the involved site is **not** required for the (non-blood site) criteria, and no such culture is collected, it is necessary to use clinical judgment regarding the likelihood of the organisms causing a secondary bloodstream infection."
- "… The flow diagram on the next page may be used to help determine the relatedness of a primary site of infection to a positive blood culture."

*Pages 4-10 and 4-11 of the Chapter 4 CLABSI Event, of the NHSN Patient Safety Component Manual

Appendix 1. Secondary Bloodstream Infection (BSI) Guide

What is the meaning of the statement "not related to infection at another site" in relation to a positive blood culture?

- "In addition, if the blood isolate by itself does not meet BSI criteria (e.g., only one positive blood culture of a common commensal), then that isolate may not be used to indicate the presence of a secondary BSI. For example, the patient has an HAI meeting criteria for symptomatic urinary tract infection due to *E. coli* and a single positive blood culture with *E. coli* and *S. epidermidis*, the SUTI should be reported as having a secondary bloodstream infection, but only *E. coli* should be listed as the infecting pathogen."



Appendix 1: Secondary Bloodstream Infection Guide; NHSN Manual, Chapter 4 CLABSI Event

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LCBI- Criterion 2

- Patient has at least <u>one</u> of the following signs or symptoms: fever (>38^{0}C), chills or hypotension

<u>And</u>

- positive laboratory results are not related to an infection at another site

<u>And</u>

- <u>common commensal</u> (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not B. antrhacis] spp., Propionibacterium spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from <u>two</u> or more blood cultures drawn on separate occasions.

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LCBI Criterion 3

- Patient ≤ 1 yr of age has at least one of the following signs or symptoms: fever (>38^{0}C core), hypothermia (<36^{0}C core), apnea, or bradycardia

And

- positive laboratory results are not related to an infection at another site

And

- common commensal (i.e. diptheroids [*Corynebacterium* spp.], *Bacillus* [not B. antrhacis] spp., Propionibacterium spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.

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Note

- Criteria 1 & 2 may be used for patients of ANY age, including those 1 year or less.
- Criterion 3 **only applies** to patients who are **1 year or less (before the second birthday)**.

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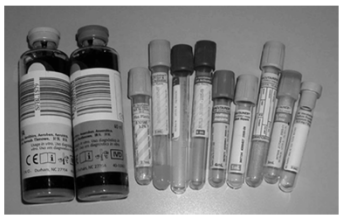
<u>One or more blood cultures</u> means that at least one bottle from a blood draw is reported by the laboratory as having grown at least one organism (i.e., is a positive blood culture).

More details for …Criterion 1



<u>Recognized pathogen does not include</u> organisms considered common commensals

A few of the <u>recognized pathogens</u> are Staph aureus, Enterococcus spp., E. coli, Pseudomonas spp., Klebsiella spp., Candida spp., etc.

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Criteria 2 & 3:

The phrase "common commensal... is cultured from two or more blood cultures (BC) drawn on separate occasions" means:

1. That blood from at least two blood draws were collected within two days of each other,

And

2. That at least one bottle from each blood draw is reported by the laboratory as having grown the same common commensal(s) (i.e., is a positive BC)
3. That these blood cultures were collected within 2 days of each other e.g. Mon. and Tues, but NOT Mon. and Wed.

2013 change

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Meeting "Separate Occasions" Criteria

- Blood draws collected from separate sites OR
- Separate accesses of the same site, such as two draws from a single lumen catheter or draws from separate lumens of a catheter. In the latter case, the draws may be just minutes apart (i.e., just the time it takes to disinfect and draw the specimen from each lumen).

  Example: a patient with a triple lumen central line has blood drawn from each lumen within 15 minutes of each other. Each of these is considered a separate blood draw.

Criteria 2 & 3 Determining "sameness" of common commensals

- Assume that the organisms are the same if the organism from one culture is identified to both genus and species level and the companion culture identifies only the genus with or without other attributes.
- Antibiograms are no longer utilized to determine the sameness of two organisms.
- Report the more resistant organism.

  Examples:

Culture Report	Companion Culture Report	Report as…
Coagulase-positive staphylococci	*S. aureus*	*S. aureus*
S. epidermidis	Coagulase-negative staphylococci	*S. epidermidis*
Enterococcus spp.	*E. faecium*	*E. faecium*
Bacillus spp. (not *anthracis*)	*B. cereus*	*B. cereus*
S. salivarius	Strep viridans	*S. salivarius*

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Mucosal Barrier Injury Laboratory-Confirmed Bloodstream Infection (MBI-LCBI)

- **Developed by Healthcare Infection Control Practices Advisory Committee (HICPAC) Surveillance Working Group**
  - Need for more specific BSI definition in oncology patients
  - Misclassification of BSI resulting from translocation of intestinal organisms inflates CLABSI rates
  - Reporting of CLABSI that are not BSI associated with the central line
  - These BSIs are not impacted by CLABSI prevention measures
  - Developed BSI definition for patients with mucosal barrier injury (e.g., GVHD, neutropenia) at high risk for translocation of intestinal organisms
  - Lead by CDC with input from external subject matter experts
    - Hospital Epidemiologist, Infection Preventionist, Infectious Disease Physicians, State HAI Programs, Oncologists
  - Considerations given to data collection burden, use of objective criteria, availability of data components, clinical credibility

Mucosal Barrier Injury Laboratory-Confirmed Bloodstream Infection (MBI-LCBI)

- **MBI-LCBI definition field-tested**
  - In 38 hospitals and 193 inpatient locations
    - ~50% Oncology or BMT locations
  - Performed over 2 months, incorporated into existing CLABSI surveillance
  - Data from all blood cultures reviewed reported to CDC
- **Findings from field testing**
  - High degree of agreement between facility and CDC application of MBI-LCBI definition
  - Identified need for adjustments to neutropenia criteria
    - Due to differences on lab reporting of WBC/ANC values
  - Demonstrated integrating MBI-LCBI definition in CLABSI surveillance was feasible
-

MBI-LCBI Criterion 1

- **Patient of any age meets criterion 1 for LCBI with at least one blood culture growing any of the following intestinal organisms <u>with no other organisms isolated</u>: *Bacteroides* spp., *Candida* spp., *Clostridium* spp., *Enterococcus* spp., *Fusobacterium* spp., *Peptostreptococcus* spp., *Prevotella* spp., *Veillonella* spp., or Enterobacteriaceae (see Table 3 for partial list of eligible genera)**

<u>AND</u>

Patient meets at least one of the following:

- **Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalization as positive blood culture:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥1 liter diarrhea in a 24 hour period (or ≥20 mL/kg in a 24 hour period for patients <18 years of age) with onset on or within 7 calendar days before the date the positive blood culture is collected.
- **Is neutropenic, defined as at least 2 separate days with values of absolute neutrophil count (ANC) or total white blood cell count (WBC) <500 cells/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1).**

MBI-LCBI Criterion 2

- **Patient of any age meets criterion 2 for LCBI when the blood cultures are growing only viridans group streptococci <u>with no other organisms isolated</u>**

<u>AND</u>

- **patient meets at least one of the following:**
- **Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalization as positive blood culture:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥1 liter diarrhea in a 24 hour period (or ≥20 mL/kg in a 24 hour period for patients <18 years of age) with onset on or within 7 calendar days before the date the first positive blood culture was collected.
- **Is neutropenic, defined as at least 2 separate days with values of absolute neutrophil count (ANC) or total white blood cell count (WBC) <500 cells/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)**

MBI-LCBI Criterion 3

- **Patient <1 year of age meets criterion 3 for LCBI when the blood cultures are growing only viridans group streptococci <u>with no other organisms isolated</u>**

<u>AND</u>

- **patient meets at least one of the following:**
- **Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalization as positive blood culture:**
  - Grade III or IV gastrointestinal graft versus host disease (GI GVHD)
  - ≥ 20 mL/kg in a 24 hour period for patients <18 years of age with onset on or within 7 calendar days before the date the first positive blood culture is collected.
- **Is neutropenic, defined as at least 2 separate days with values of absolute neutrophil count (ANC) or total white blood cell count (WBC) <500 cells/mm^3 on or within 3 calendar days before the date the positive blood culture was collected (Day 1). (See Table 4 for example.)**
-

MBI-LCBI Criteria

- **Comments:**
  - No other organisms isolated" means there is not isolation in a blood culture of another recognized pathogen (e.g., S. aureus) or common commensal (e.g., coagulase-negative staphylococci) other than listed in MBI criterion 1, 2 or 3 <u>that would otherwise meet LCBI criteria</u>. If this occurs, the infection should not be classified as MBI-LCBI.
-
  - Grade III/IV GI GVHD is defined as follows:
    - In adults: ≥1 L diarrhea/day or ileus with abdominal pain
    - In pediatric patients: ≥ 20cc/kg/day of diarrhea
- **Reporting Instructions:**
  - If patient meets criteria for a GI tract specific infection site and has a matching positive blood culture isolate or the blood isolate is a logical pathogen for that infection site that does not require a culture result, report the BSI as a secondary BSI.

MBI-LCBI Criteria

Table 3. Partial List of Criterion 1 MBI-LCBI Eligible Enterobacteriaceae Genera*

- **Citrobacter**
- **Enterobacter**
- **Escherichia**
- **Klebsiella**
- **Proteus**
- **Providencia**
- **Salmonella**
- **Serratia**
- **Shigella**
- **Yersina**

* Chapter 4 CLABSI Event, Page 4-10 of NHSN manual dated January 2013

Calculation of ANC

- **Remember:**
  - ANC not always reported directly in chart.
  - WBC in chart usually reported in terms of *thousand* cells/mm^3.
- **ANC calculated based on Segmented cells (Segs) and Bands**
  - ANC = Absolute Segs + Absolute Bands **or**
  - ANC = WBC × (%Segs + %Bands)/100
- **<u>Example:</u>**
  - WBC = 2 K/mm^3
  - Segs: 20%
  - Bands: 20%
  - ANC = 2,000 × (20 + 20)/100 = 800 cells/mm^3

MBI-LCBI Criteria

Table 4. Examples Illustrating the MBI-LCBI Criteria for Neutropenia*

		Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1*	Day 2
Pt. A	WBC	100	800	400	300	ND	ND	320	400 + BC* w/ Candida spp. x1	230

Patient A meets MBI-LCBI criterion 1.2: Positive blood culture with intestinal organism (Candida spp.) and neutropenia (2 separate days of WBC <500 cells/mm3 occurring on the date the positive blood culture was collected [Day 1, value = 400] or during the 3 days before that date [in this case, the day before or Day -1; value = 320]).

* Chapter 4 CLABSI Event, Page 4-11 of NHSN manual dated January 2013

MBI-LCBI Criteria

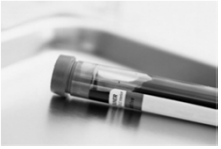
Table 4. Examples Illustrating the MBI-LCBI Criteria for Neutropenia*

		Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1*	Day 2
Pt. B	ANC	ND	410	130	ND	ND	120	110	ND +BC* w/ viridans strep x2 and fever >38.0° C	110

Patient B meets MBI-LCBI criterion 2.2: At least 2 positive blood cultures with viridans group streptococci (in this case, 2 positive) and neutropenia (2 separate days of ANC <500 cells/mm3 occurring on the date the positive blood culture was collected [Day 1] or during the 3 days before that date [in this case, the two days before or Days -1 and -2; values = 110 and 120]).

* Chapter 4 CLABSI Event, Page 4-11 of NHSN manual dated January 2013

Collecting Blood Culture Specimens



Ideally, blood specimens for culture should be obtained from two to four blood draws from separate venipuncture sites (e.g., right and left antecubital veins), not through a vascular catheter.

These blood draws should be performed simultaneously or over a short period of time (i.e., within a few hours).

If your facility does not currently obtain specimens using this technique, you may still report BSIs using the NHSN criteria, but you should work with appropriate personnel to facilitate better specimen collection practices for blood cultures.

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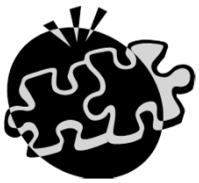
Utilizing Central line-associated MBI-LCBI Data



Considerations for future use of MBI-LCBI data include removing from CLABSI data reported to CMS. At this time this is not possible. Central-line associated MBI-LCBI data will be included in the CLABSI data reported to CMS.

Your facility may choose to consider MBI-LCBI data separately from LCBI data in your internal QA work as prevention efforts for the two types of BSI may differ.

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CLABSI Denominator Data

Denominator Accuracy

- **Accurate rates/standardized infection ratios (SIRS) require BOTH**
  - Accurate numerators
    - Definitions/Reporting Instructions Adherence
  - Accurate denominators
    - Mapping accuracy (Day 3 topic)
    - Collection accuracy

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Accurate Denominator Collection

- Specific requirements by location type
- Patients with > 1 line

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Accurate Denominator Data: Requirements by Location

- **ICU (not NICU)/Non-Special Care Areas (SCA):**
  - Central line days
  - Patient days
- **SCA:**
  - Permanent central line days
  - Temporary central line days
  - Patient days
- **NICU:**
  - Central line and umbilical catheter days
  - Patient days

  } By birth-weight category*

* The weight of the infant at the time of BSI is not used and should not be reported.

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Accurate Denominator Data Special Care Areas (SCAs)

- SCAs are locations where a permanent (a.k.a. tunneled) central lines are likely
  - Oncology
  - Hemodialysis
  - Transplant
- Because temporary central lines carry a higher risk of CLABSI, on these locations data is collected by type permanent vs. temporary

Accurate Denominator Data Neonatal ICUs (NICUs)

- Because risk of CLABSI is associated with birthweight category, central line data (numerator and denominator) is collected based on this variable
- Birthweight categories
  - ≤ 750 grams
  - 751-1000 grams
  - 1001- 1500 grams
  - 1501- 2500 grams
  - > 2501 grams

Accurate Denominator Collection

- **Patients with ≥ 2 CLs get counted as 1 CL day**
- **Patients with both permanent and temporary CLs get counted only as 1 temporary CL day**
  - **Permanent central line**: A central line that is tunneled, including certain dialysis catheters and implantable catheters (including ports).
  - **Temporary central line:** A central line that is not tunneled nor implanted.

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Accurate Denominator Collection

- **Neonates with both umbilical and central lines get counted only as central line day**
- **NOTE: "If the patient has only a tunneled or implanted central line, begin recording days on the first day the line was accessed and continue throughout entire stay."**

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Accurate Denominator Collection

- **Examples of possible causes:**
  - Patients with 2 central lines counted as 2 CL days
  - Data import happening twice a day rather than once

orgid	location	summaryYQ	months	infcount	numExp	numclDays	SIR	SIR_pval	SIR95CI
15331	SICU	2011Q1	3	4	6.900	3000	0.58	0.1823	0.198, 1.327

CL days 3200

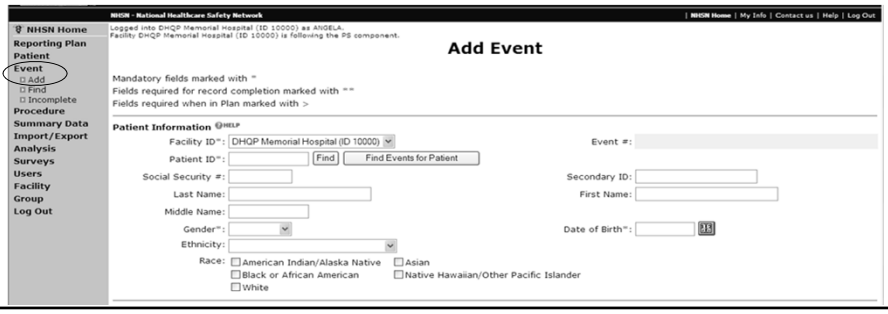
orgid	location	summaryYQ	months	infcount	numExp	numclDays	SIR	SIR_pval	SIR95CI
15331	SICU	2011Q1	3	4	12.420	5400	0.32	0.0057	0.110, 0.737

CL days 4400

67

Patient Information

- The top section of BSI data collection form is used to collect patient demographics. Required fields have an asterisk (*).
- There are 4 required fields:
  - Facility ID
  - Patient ID
  - Gender
  - Date of Birth



Event Information
CLABSI

Event Information HELP

Event Type is BSI

Event Type*: BSI-Bloodstream Infection

Date of Event*: 11/05/2011

Post-procedure:

MDRO Infection Surveillance*:

Location*:

Date Admitted to Facility>: 11/01/2011

Date of Event: Required. The date the signs or symptoms appeared or date the diagnosing urine specimen was collected, whichever comes first.

Event Information
CLABSI

Event Information HELP

Event Type*: BSI-Bloodstream Infection

Date of Event*: 11/05/2011

Post-procedure:

MDRO Infection Surveillance*: No, this infection's pathogen/location are not in-plan for Infection Surveillance in the MDRO/CDI Module

Location*:

Date Admitted to Facility>: 1/2011

MDRO Infection: Enter "YES" only if the facility's monthly reporting plan includes Infection Surveillance (NOT Lab ID Event) (MDRO/CDI Module) for both the involved pathogen and the location specified.

Event Information
CLABSI

Required. Enter patient location at the time of event onset.

Event Information HELP

Event Type*: BSI tream Infection

Date of Event*: 11/05/2011

Post-procedure: N - No

MDRO Infection Surveillance*: No, this in tion's pathogen/location are not in-plan for Infection Surveillance in the MDRO/CDI Module

Location*: 3 MS - MEDSURG ICU

Date Admitted to Facility>: 11/01/2011

Required. The date admitted to 1st inpatient location

If the BSI develops in a patient within 2 days of transfer from a location, indicate the transferring location, not the current location of the patient.

Risk Factors
CLABSI

Risk Factors HELP

Central line*:

Event Details HELP

Y - Yes
N - No

Required: Choose Yes if a CL was in place in the 2 days prior to onset of infection. Otherwise choose No

Event Details: Specific Event

Available selections based on Event Type

Event Details HELP

Specific Event>: LCBI - Laboratory confirmed bloodstream infection

Specify Criteria Used*

Signs & Symptoms (check all that apply)

Any patient	<=1 year old
Fever	Fever
Chills	Hypothermia
Hypotension	Apnea
	Bradycardia

Laboratory (check one)

- Recognized pathogen from one or more blood cultures
- Common commensal from >= 2 blood cultures

Died**:

Discharge Date:

Pathogens Identified: Y - Yes / N - No

Died is required for completion but not for saving.

Event criteria must be met.

Event Details: Secondary BSI

Pathogens Identified: Y - Yes

Will autofill as Yes..

Pathogens HELP

Pathogen 1: Search

Pathogen 2: Search

Pathogen 3: Search

Identify up to 3 pathogens utilizing the search menu

Event Details: Secondary BSI

Pathogens Identified: Y-Yes

Pathogens HELP

Pathogen 1: *Staphylococcus aureus - SA* Search 15 drugs required

CIPRO	LEVO	MOXI	DOXY	MINO	CEFOX	METH	OX
S R I N	S R I N	S R I N	S R I N	S R I N	S R I N	S R I N	S R I N

HLOR	CLIND	DAPTO	ERYTH	GENT	LNZ	QUIDAL	RIF
S R N	S R I N	S NS N	S R I N	S R I N	S R N	S R I N	S R I N

RA	TIG	TMZ	VANC
R N	S NS N	S R I N	S R I N

Fill in antibiotic testing for at least one drug in each box.

Select N if not tested.

THEN SAVE THE EVENT!!!

Collecting Summary Data (ICUs/Wards)

Reminder

For all locations, count **at the same time each day**
- Number of patients on the unit
- Number of patients with a central line

NHSN National Healthcare Safety Network

OMB No. 0920-0666
Exp. Date: 01-31-2015
www.cdc.gov/nhsn

Denominators for Intensive Care Unit (ICU)/Other locations (not NICU or SCA)

Page 1 of 1

*required for saving
Facility ID: *Location Code: *Month: *Year:

Date	*Number of Patients	**Number of patients with 1 or more central lines	**Number of patients with a urinary catheter	**Number of patients on a ventilator
1	32	21		
2	29	17		
3	29	15		
4				

Collecting Summary Data (NICUs)

Reminder

For NICUs, count **at the same time each day**
- Number of patients in each birthweight category on the unit
- Number of patients in each birthweight category with a central line

Safety Network www.cdc.gov/nhsn

Denominators for Neonatal Intensive Care Unit (NICU)

Page 1 of 1
*required for saving **conditionally required according to the events indicated in Plan

Facility ID: *Location Code: *Month: *Year:

Date	A = ≤750 g				B = 751-1000 g				C =1001-1500 g				D = 1501-2500 g				E= >2500 g			
	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC	*Pt	**CL	**VNT	UrC
1	1	1			4	3			6	2			3	1			0	0		
2	1	1			3	3			5	2			3	1			0	0		
3	2	2			3	2			5	2			3	1			1	0		
4	2	2			2	1			5	1			4	1			2	0		
5																				
6																				
7																				

Collecting Summary Data (SCAs)

Reminder

For SCAs, count **at the same time each day**
- Number of patients on the unit
- Number of patients with ONLY a permanent central line
- Number of patients with a temporary central line

Safety Network www.cdc.gov/nhsn

Denominators for Specialty Care Area (SCA)

Page 1 of 1
*required for saving
Facility ID: 88888 *Location Code: Hem/Onc *Month: June *Year: 2102

Date	*Number of Patients	**Number of patients with 1 or more central lines (if patient has both, count as Temporary)		**Number of patients with a urinary catheter	**Number of patients on a ventilator
		Temporary	Permanent		
1	46	2	43		
2	49	1	45		
3	48	3	45		
4	50	8	40		
5					

Entering Summary Data (ICU/Wards)

NHSN - National Healthcare Safety Network

NHSN Home
Reporting Plan
Patient
Event
Procedure
Summary Data
Add
Find
Incomplete
Import/Export
Analysis
Surveys
Users
Facility
Group
Log Out

Logged into DHQP Memorial Hospital (ID 10000) as ANGELA.
Facility DHQP Memorial Hospital (ID 10000) is following the PS component.

Denominators for Intensive Care Unit (ICU)/ Other locations (not NICU or SCA)

HELP

Mandatory fields marked with *

Facility ID*: 10000 (DHQP Memorial Hospital)
Location Code*: CMICU - CARDIAC ICU
Month*: March
Year*: 2010

Report No Events

Total Patient Days: 55555
Central Line Days: 555
Urinary Catheter Days: 555
Ventilator Days: 255

CLABSI: ☐
CAUTI: ☑
VAP: ☐

Check Box if **NO** CLABSI events to report

Sum for Month

Entering Sumary Data (SCAs)

NHSN Home
Reporting Plan
Patient
Event
Procedure
Summary Data
Add
Find
Incomplete
Import/Export
Analysis
Surveys
Users
Facility

Logged into Decennial Medical Center (ID 15331) as KATHY.
Facility Decennial Medical Center (ID 15331) is following the PS component.

Denominators for Specialty Care Area (SCA)

HELP

Mandatory fields marked with *

Facility ID*: 15331 (Decennial Medical Center)
Location Code*: BMT - BONE MARROW TRANSPLANT
Month*: June
Year*: 2011

Report No Events

Total Patient Days*: 257
Temporary Central Line Days*: 159
Permanent Central Line Days*: 200
Urinary Catheter Days:
Ventilator Days:

TCLAB: ☐
PCLAB: ☐
CAUTI: ☐
VAP: ☐

Check box if **NO** CLABSI events for central line type to report

Sum for Month

Entering Summary Data NICUs

NHSN Home
Reporting Plan
Patient
Event
Procedure
Summary Data
Add
Find
Incomplete
Import/Export
Analysis
Surveys
Users
Facility
Group
Log Out

Logged into Decennial Medical Center (ID 15331) as KATHY.
Facility Decennial Medical Center (ID 15331) is following the PS component.

Neonatal Intensive Care Unit

HELP

Mandatory fields marked with *

Facility ID*: 15331 (Decennial Medical Center)
Location Code*:
Month*:
Year*:

Sum for Month

Check appropriate box if **NO** CLABSI events to report in a BW category

Birth Wt.	Patient Days	CL Days	No CLABSI	Vent Days	No VAP	UrC Days
<=750						
751-1000						
1001-1500						
1501-2500						

Electronic Collection of Summary Data

Electronic capture of summary data is acceptable:

- Following validation of the electronic method against the manual method
  - 3 months concurrent data collection with both methods
  - Difference between methods must be within +/- 5% of each other

In Summary

- **CLABSIs result in significant morbidity and mortality in U.S. hospitals.**
- **Clinical and surveillance definitions will sometimes differ.**
  - Purposes differ
  - Surveillance definitions must be adhered to strictly and consistently
- **2013 CLABSI definitional changes include 2-day minimum facility stay for HAIs and 2-day prior minimum device dwell time for BSI to be CLABSI**
- **.**

In Summary

- **New LCBI criteria have been added for Mucosal Barrier Injury BSIs (MBI-LCBI). These will be included for CLABSI reporting to CMS at this time.**
- **Accurate data collection is necessary for successful prevention efforts and is dependent on a variety of factors:**
  - Accurate CLABSI identification and attribution
  - Accurate central line data collection
  - Accurate mapping of facility locations within NHSN

Please place tab here with the number and title 5. Introduction to NHSN Analysis.
Presentation should be double sided, black and white, and 2 slides per page.

Introduction to NHSN Analysis: A Focus on Device-associated Data

Maggie Dudeck, MPH, CPH
NHSN Training Course
Atlanta, GA
October 2, 2012

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Objectives

- Review reasons for analyzing your NHSN data
- Discuss how to get started analyzing your data in NHSN
- Illustrate basic modifications to standard output options
- Interpret rates, device utilization ratios, standardized infection ratios, and comparative statistics for the device-associated module.

Why Analyze?

- Analysis tools within NHSN help facilitate internal validation activities.
- Reports generated from NHSN can help inform prioritization and success of prevention activities.
- Data entered into NHSN may be used by: CDC, CMS, your state health department*, your corporation*, special study groups*, etc.
- At the end of the day, these are YOUR data – you should know your data better than anyone else.
- Take ownership and discover how your data can tell a story about your facility!

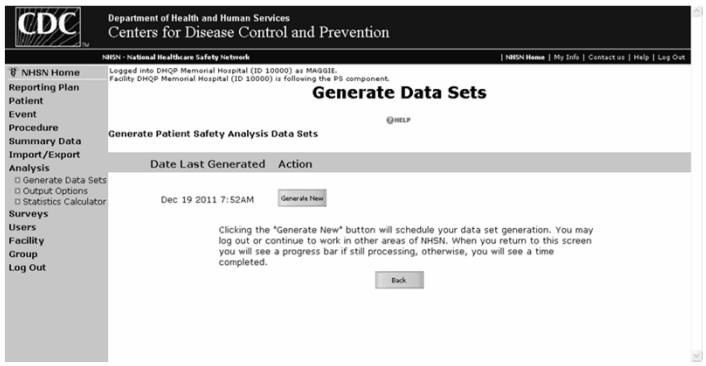
*dependent on membership to groups in NHSN and facility's acceptance of conferred rights to data.

GENERATING DATASETS

Generating Datasets

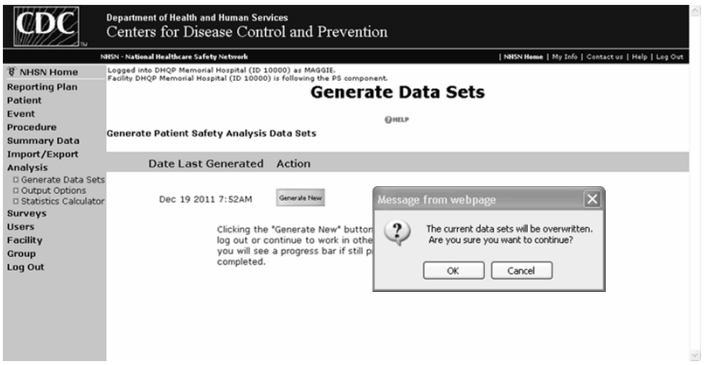
- **Generating datasets is the first step in performing analysis in NHSN**
  - Organizes data into defined sets for analysis
  - Copies and freezes data
  - Allows for quicker generation of reports
  - When analyzing data in NHSN, you are using a *copy* of your data, not the live database
- **Each user has his/her own analysis datasets**
  - Based on a user's rights
- **May take several minutes to complete this process**
- **You may navigate or leave NHSN while datasets are generating**

Generating Datasets



- **To generate datasets, navigate to Analysis > Generate Datasets.**
- **On the Generate Datasets screen, you may see either "Not Generated" or a date and time under "Date Last Generated".**

Generating Datasets

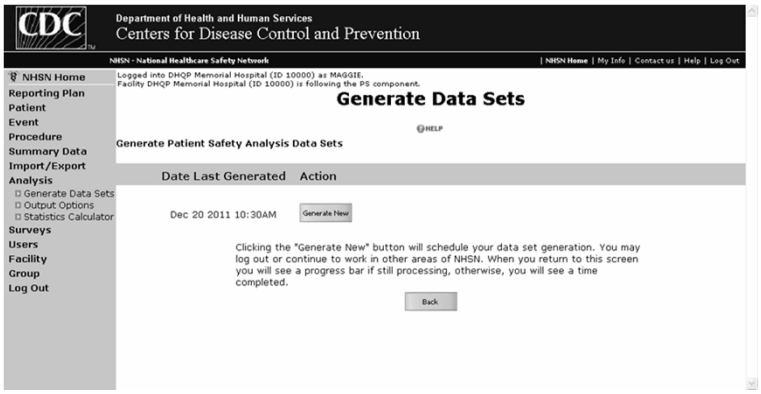


- **On the "Generate Datasets" screen, click the 'Generate New' button.**
- **Once clicked, you will be asked to confirm that existing datasets will be overwritten. Click 'OK'.**

Generating Datasets

- **While datasets are generating, you'll see a blue progress bar advance as the process continues.**
- **You may leave this screen or even leave NHSN while this process is taking place.**

Generating Datasets



- **Once the dataset generation process is complete, the "Date Last Generated" will be updated.**
- **You are now ready to analyze data!**

ANALYSIS OUTPUT OPTIONS

Analysis Output Options

- After datasets are generated, you are ready to analyze your data in NHSN
- Reports are referred to as "Output Options"
- Output options are organized in a "tree view" that will guide you toward the data you wish to analyze

Analysis Output Options

- **Line Lists**
  - Allows for record-level review of data
  - Helpful in pinpointing issues in data validity/quality
  - Can help inform rates or identify trends
  - Most customizable type of output from NHSN

National Healthcare Safety Network
CLABSI Events
As of: January 17, 2012 at 11:01 AM
Date Range: CLAB_EVENTS.evntDateYr 2011 to 2011

Event ID	Date of Birth	Gender	Fac Admission Date	Event Date	Event Type	Specific Event	Location	Days: Admit to Event	Age on Event Date
234800	09/13/1954	F	02/09/2011	02/11/2011	BSI	LCBI	MICU	3	56
234771	06/15/1956	F	03/20/2011	03/22/2011	BSI	LCBI	71ICU	3	54
234801	07/22/1976	M	02/02/2011	02/05/2011	BSI	LCBI	MICU	4	34
234747	05/13/1953	F	01/31/2011	02/03/2011	BSI	LCBI	71ICU	4	57
234818	09/21/1973	F	01/09/2011	01/12/2011	BSI	LCBI	MICU	4	37
158848	09/13/1942	F	06/10/2011	06/13/2011	BSI	LCBI	MICU	4	68
234802	01/21/2000	F	01/05/2011	01/08/2011	BSI	LCBI	MICU	4	10
234749	09/21/1974	M	03/18/2011	03/21/2011	BSI	LCBI	71ICU	4	36

Analysis Output Options

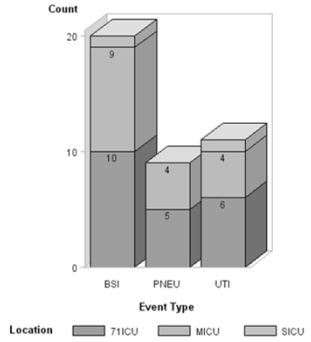
- **Frequency Tables**
  - Allows you to obtain counts of records meeting certain criteria
  - Example: How many CAUTIs were reported as ABUTI?
  - Example: What is the distribution of ASA Score for each of our colon surgery procedures?
  - Can also perform chi-square analyses for statistical comparisons

National Healthcare Safety Network
CAUTI Events
As of: January 17, 2012 at 11:04 AM
Date Range: CAU_EVENTS evntDateYr 2011 to 2011

Frequency Percent Row Pct Col Pct	Table of evntDateYQ by spcEvent		
	spcEvent(Specific Event)		
evntDateYQ(Event~Yr/Qtr)	ABUTI	SUTI	Total
2011Q1	2	3	5
	18.18	27.27	45.45
	40.00	60.00	
	50.00	42.86	
2011Q2	2	4	6
	18.18	36.36	54.55
	33.33	66.67	
	50.00	57.14	
Total	4	7	11
	36.36	63.64	100.00

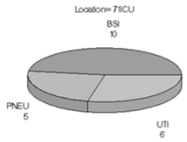
Analysis Output Options

National Healthcare Safety Network
All Device-Associated Events
As of: January 17, 2012 at 11:09 AM
Date Range: DA_EVENTS evntDateYr 2011 to 2011



- **Bar Charts & Pie Charts**
  - Graphical report of counts of records meeting certain criteria (think of these as a graphical representation of the frequency table)
  - Example: How many CLABSI events occurred in each ICU?
  - NOTE: These options do not graphically present rates or standardized infection ratios.

National Healthcare Safety Network
All Device—Associated Events
As of: January 17, 2012 at 11:12 AM
Date Range: DA_EVENTS evntDateYr 2011 to 2011
FREQUENCY of eventType



Analysis Output Options

- **Rate Tables**
  - Display your facility's calculated rates and device-utilization ratios (where appropriate)
  - If available, provide NHSN published pooled means and the comparison of your facility's rates and ratios to the pooled means
  - Descriptions of rates can be found in the event-specific chapters of the NHSN Manual

National Healthcare Safety Network
Rate Table for Central Line-Associated BSI Data for ICU-Other
As of: January 17, 2012 at 11:18 AM
Date Range: CLAB_RATESICU summaryYr 2011 to 2011

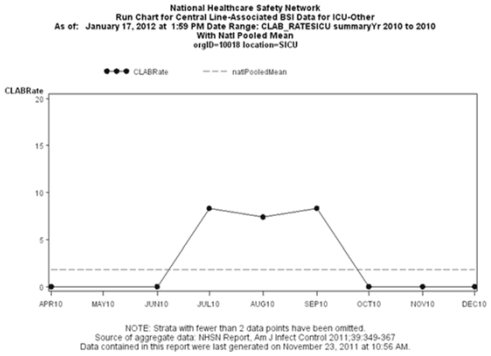
Org ID=10018 CDC Location=IN:ACUTE:CC:CT

Location	Summary Yr/Qtr	months	CLA BSI Count	Central Line Days	CLA BSIRate	NHSN CLAB Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	CL Util Ratio	NHSN Line DU Pooled Mean	Proportion p-value	Proportion Percentile
71ICU	2011Q1	3	6	730	8.219	1.2	0.0003	100	1300	0.562	0.71	0.0000	30
71ICU	2011Q2	2	2	420	4.762	1.2	0.0880	99	1025	0.410	0.71	0.0000	9

Source of aggregate data: NHSN Report, Am J Infect Control 2011;39:349-367
Data contained in this report were last generated on November 23, 2011 at 10:56 AM.

Analysis Output Options

- **Run Charts**
  - Allow you to graph rates and device-utilization ratios over time
  - Can include NHSN pooled mean and/or other defined reference line



Analysis Output Options

- **Standardized Infection Ratios (SIRs)**
  - Risk-adjusted summary measure
  - Available for CAUTI, CLABSI, and SSI data
  - Details can be found in the SIR Newsletter, available at: http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf

National Healthcare Safety Network
SIR for All Central Line-Associated BSI Data - By OrgID
As of: January 17, 2012 at 2:03 PM
Date Range: CLAB_RATESALL summaryYr 2011 to 2011

orgid=10018

orgid	summaryYH	infCount	numExp	numCLDays	SIR	SIR_pval	SIR95CI
10018	2011H1	17	3.755	2232	4.527	0.0000	2.636, 7.249

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.
Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.
SIR excludes those months and locations where device days are missing or 0 device days were reported.
Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805
Data contained in this report were last generated on November 23, 2011 at 10:56 AM.

Modifying and Interpreting Output

REAL WORLD EXAMPLES

Example #1
Device-associated Infection Line List

- **Let's say you would like a list of all of the device-associated (DA) infections that your facility has reported to NHSN for the time period January – June 2011. You would like one table per ICU location and you need the list sorted by event date. Additionally, you would like to include the specific event type reported for each infection.**
- **You also suspect that you will need this line list on more than one occasion, for different time periods, and would like to save this as a custom report.**

(refer to pages 2 & 3 of your Results handout)

Example #2
CAUTI Rate Table

- **It's Annual Report time!**
  - You need to compile various annual reports for your infection control committee meeting, including a report of 2011 annual CAUTI rates (i.e., one rate for the year) for 4 ICU locations: 2MSICU, MICU, MSICU, SICU.
  - You will be expected to compare each location's rates and device utilization ratios to the national data.

Device-associated Rates

- **Device-associated (DA) rates are calculated as Incidence Density Rates (IDRs)**
- **What is an "Incidence Density Rate"?**
  - Numerator = # of new cases during a period of time
  - Denominator = person-time during that same period of time
  - Uses a multiplier for interpretation
  - Also referred to as "IDR"

Question #1
Incidence Density Rates

What measure of person-time is used in the calculation of CAUTI rates in NHSN?

1. Patient days
2. Catheter insertions
3. Patient admissions
4. Catheter days

Example #2

- **Let's look at our data within NHSN…**

(refer to pages 4 & 5 of your Results handout)

Question #2
MICU CAUTI Rate

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50

How would you interpret the MICU's CAUTI rate of 1.827?

1. 1.8 per 1,000 catheter days
2. 1.8%
3. 1.8 per 1,000 patient days
4. 1.8 times higher than the national

What are the chances…?

- **This probability is called the p-value**
- **Helps determine <u>rarity</u>…how rare is this outcome that it could not have happened by chance alone?**
- **If the p-value is very small (less than 1 in 20 or 5% or 0.05; hence p<0.05):**
  - Conclude that our CAUTI rate is "significantly different" than the NHSN pooled mean
  - OTHERWISE (i.e., if p>0.05) conclude that our CAUTI rate is no different than the NHSN pooled mean
- **NOTE: p<0.05 is a *convenient* cut-point that is widely accepted**
- **Today, we will use p<0.05 as our cut-point**

P-values and DA Rates

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50

- **The p-value is included in the DA rates in NHSN.**
- **What is being compared?**
  - Your facility's rate, by location, to the NHSN pooled mean for that same location type

The p-value…

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50

- **When the p-value is >0.05, you could interpret this as:**
  - Based on statistical evidence, our rate is no different than the NHSN pooled mean.

QUESTION #3
The p-value…

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50

Based on the p-value, is our CAUTI rate statistically significantly different from the NHSN pooled mean?

A. **Yes**
B. **No**
C. **Not sure**

QUESTION #4
Percentile

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50

How would you interpret the percentile for the MICU?

1. **50% of the medical ICUs reporting to NHSN had a rate higher than ours.**
2. **50% of the medical ICUs reporting to NHSN had a rate lower than ours.**
3. **Our rate of 1.827 is at the median point on the distribution of rates**
4. **All of the above.**

Percentiles

Table 5. Pooled means and key percentiles of the distribution of urinary catheter-associated UTI rates and urinary catheter utilization ratios, by type of location, DA module, 2010

Urinary catheter-associated UTI rate*					Percentile				
Type of location	No. of locations†	No. of CAUTI	Urinary catheter-days	Pooled mean	10%	25%	50% (median)	75%	90%
Critical care units									
Burn	23	115	24,324	4.7	0.0	2.2	4.7	7.2	9.6
Medical-Major teaching	67	470	192,002	2.4	0.3	0.9	1.8	3.7	5.5
Medical-All other	110 (107)	436	232,454	1.9	0.0	0.0	1.2	2.5	4.0
Medical cardiac	139	414	213,535	1.9	0.0	0.3	1.6	3.1	4.3

- **Percentile provides a value at which a percent of the distribution falls at or below.**
- **CDC publishes percentiles at specified intervals.**
- **Within NHSN, we provide *exact* percentile of where your rate falls on the distribution.**

Why use Percentiles??

Table 5. Pooled means and key percentiles of the distribution of urinary catheter-associated UTI rates and urinary catheter utilization ratios, by type of location, DA module, 2010

	Urinary catheter-associated UTI rate*				Percentile				
Type of location	No. of locations†	No. of CAUTI	Urinary catheter-days	Pooled mean	10%	25%	50% (median)	75%	90%
Critical care units									
Burn	23	115	24,324	4.7	0.0	2.2	4.7	7.2	9.6
Medical-Major teaching	67	470	192,002	2.4	0.3	0.9	1.8	3.7	5.5
Medical-All other	110 (107)	436	232,454	1.9	0.0	0.0	1.2	2.5	4.0
Medical cardiac	139	414	213,535	1.9	0.0	0.3	1.6	3.1	4.3

- **Allow you to see "where you fall" compared to those who contributed to the pooled mean**
- **Allow you to assess the range of rates in that type of location**
- **Can aide in setting goals different than the pooled mean**

Device Utilization Ratios

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	Patient Days	Cath Util Ratio	CathDU_ Mean	Proportion p-value	Proportion Percentile
MICU	2011	12	6	3284	1.827	4943	0.664	0.73	0.0000	26

- **Device utilization (DU) ratios help assess the proportion of days in which patients were at risk for the DA infection**
- **Calculated as:**

Device Utilization Ratios

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	Patient Days	Cath Util Ratio	CathDU_ Mean	Proportion p-value	Proportion Percentile
MICU	2011	12	6	3284	1.827	4943	0.664	0.73	0.0000	26

- **Similar to DA rates, your location's DU ratio is compared to the NHSN pooled mean**
- **A p-value and a percentile are included in the results**

QUESTION #5
The DU Ratio p-value

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	Patient Days	Cath Util Ratio	CathDU_ Mean	Proportion p-value	Proportion Percentile
MICU	2011	12	6	3284	1.827	4943	0.664	0.73	0.0000	26

Based on the p-value, how would you interpret the comparison of the MICU's DU ratio to the NHSN pooled mean?

1. **The DU ratio in the MICU is statistically significantly different from the NHSN pooled mean**
2. **The DU ratio in the MICU is <u>not</u> statistically significantly different from the NHSN pooled mean**
3. **Not sure – it appears that the p-value isn't calculated**

CAUTI Rate Interpretation

Location	Summary Yr	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	Cath Util Ratio	CathDU_ Mean	Proportion p-value	Proportion Percentile
MICU	2011	6	3284	1.827	2.4	0.3086	50	4943	0.664	0.73	0.0000	26

- **During 2011, there were 6 CAUTIs reported with 3284 urinary catheter days in the MICU.**
- **This yields a rate of 1.827 CAUTIs per 1,000 urinary catheter days.**
- **Using a cutpoint of $p<0.05$, the p-value indicates that the CAUTI rate in this MICU is not statistically significantly different from the NHSN pooled mean.**
- **Further, this MICU's rate is at the 50th percentile among all medical ICUs contributing to the aggregate data.**

CAUTI Rate Interpretation

Location	Summary Yr	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	Cath Util Ratio	CathDU_ Mean	Proportion p-value	Proportion Percentile
MICU	2011	6	3284	1.827	2.4	0.3086	50	4943	0.664	0.73	0.0000	26

- **During this same time period, there were 4943 patient days reported in the MICU.**
- **Dividing the number of urinary catheter days by the number of patient days, the DU ratio for the MICU is 0.664.**
- **Using a cutpoint of $p<0.05$, the p-value indicates that the DU ratio in this MICU is statistically significantly different from the NHSN pooled mean.**
- **Further, this MICU's DU ratio is at the 26th percentile among all medical ICUs contributing to the aggregate data, indicating that 26% had a DU ratio at or lower than the MICU's DU ratio.**

Question #6
Overall Measure

You've been asked to provide an overall measure for your hospital's CAUTI experience for 2011. Which is the best option?

A. Calculate an overall CAUTI rate that combines all locations
B. You've heard rumors about something called a "standardized infection ratio"…that might help
C. Tell your administrators that it can't be done!
D. Decide to enter into early retirement.

Example #3
CLABSI SIR

- **You have just received the news that, based on the standardized infection ratio (SIR), your hospital is "WORSE than the National Benchmark" for CLABSIs in the first half of 2011 and your ID doctor has requested that you call an early Infection Control Committee meeting to discuss the CLABSI data.**

Example #3, continued

- **Before you present to the committee, you want to understand unit level data from the MICU, SICU, MSICU, and 2MSICU and how the SIR is being compared to national data.**

Standardized Infection Ratio

- **What is the standardized infection ratio?**
  - Standardized Infection Ratio, SIR, is a summary measure used to compare the HAI experience among one or more groups of patients to that of a standard population's (e.g. NHSN)
  - Indirect standardization method
  - Accounts for differences in incidence of HAI within the groups

Standardized Infection Ratio

$$SIR = \frac{\text{Observed \# of HAIs}}{\text{Expected (Predicted) \# of HAIs}}$$

- Observed # of HAI – the number of events that you enter into NHSN
- Expected or predicted # of HAI – comes from national baseline data*
- The formula for calculating the number of expected CLABSI infections is:

 # central line days *(NHSN Rate/1000)

*Source of national baseline data: NHSN Report, Am J Infect Control 2009;37:783-805
Available at: http://www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.PDF

QUESTION 7

Your Overall CLABSI SIR is 1.44. How would this be interpreted?

1. Observed more infections than expected
2. Observed fewer infections than expected
3. Observed a 44% higher rate than the national rate
4. Observed a 44% lower rate than the national rate

How do our data look in NHSN?

- **NHSN will calculate SIRs for you**
- **There is an option to obtain a CLABSI SIR specific to those data applicable for CMS IPPS reporting**
  - SIR – CLAB Data for CMS IPPS

CLABSI SIR for ICUs – 2011H1 Overall

National Healthcare Safety Network
SIR for CLAB Data for CMS IPPS - By OrgID

As of: March 23, 2012 at 3:04 PM
Date Range: CLAB_RATESALL summaryYH 2011H1 to 2011H1
if (((bsiPlan = "Y") AND (location IN ("2 MSICU", "MICU", "MSICU", "SICU"))))

Org ID=10018

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807, 2.380

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.
Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.
SIR excludes those months and locations where device days are missing.
Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805
Data contained in this report were last generated on March 8, 2012 at 3:54 PM.

CLABSI SIR for ICUs – 2011H1
Overall Interpretation

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807, 2.380

- **During this time period, we identified 15 CLABSIs in 4,564 central line days.**
- **Based on national baseline data, 10.397 CLABSIs were expected/predicted.**
- **Dividing the number of CLABSIs identified (15) by the number expected (10.397), we get an SIR of 1.443, indicating that we observed approx. 44% more infections than expected.**

Review
What are the chances…?

- **This probability is called the p-value**
- **If the p-value is very small (less than 1 in 20 or 5% or 0.05; hence p<0.05):**
  - Conclude that the number of CLABSIs observed is "significantly different" than what was expected/predicted
  - OTHERWISE (i.e., if p>0.05) conclude that the number of CLABSIs observed is no different than what was expected/predicted.
- **NOTE: p<0.05 is a *convenient* cut-point that is widely accepted**
- **Today, we will use p<0.05 as our cut-point**

P-values and the SIR

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807 , 2.380

- **The p-value is included in the SIR output options in NHSN.**
- **What is being compared?**
  - The SIR is being compared to 1
- **Why "1"?**
  - 1 represents the number of observed infections = the number of expected infections

QUESTION 8

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807 , 2.380

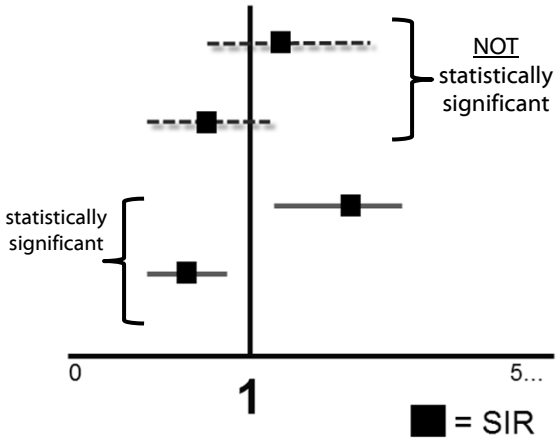
Based on the p-value, is the number of observed infections statistically significantly different from the number expected?

1. **Yes**
2. **No**
3. **Not sure**

95% Confidence Interval

- **An interval for which we have a high degree of confidence that it contains the true SIR**
  - The upper and lower limits are used to determine the significance and accuracy (or precision) of the SIR
- **Allows you to assess variability of an estimated SIR**
- **If the confidence interval includes the value of 1, then the SIR is not significant**

95% CI for SIRs



QUESTION 9

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807 , 2.380

Based on the 95% Confidence Interval, is the number of observed infections statistically significantly different from the number expected?

1. **Yes**
2. **No**
3. **Not sure**

Overall SIR Interpretation

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807 , 2.380

- **During the first half of 2011, our facility observed 15 CLABSIs in our ICU locations.**
- **The number of expected CLABSIs during this timeframe, based on national data, was 10.397 CLABSIs**
- **This yields an SIR of 1.443, indicating that we observed approx. 44% more infections than expected**
- **Based on statistical evidence, we can conclude that our SIR is no different than 1**

Notes for our meeting…

- **Although the CLABSI SIR for the ICUs, January – June 2011, indicates that we observed about 44% more infections than the national, our experience is no different than the national baseline, based on statistical evidence .**

QUESTION 10

- **Based on the overall SIR, what would your next step be?**
  A. Review the SIRs by shorter time periods
  B. Stop here. I have enough information to take to my meeting
  C. Review the SIRs for each ICU
  D. Review the CLABSI rates for this same time period
  E. Not sure

CLABSI SIR for ICUs – 2011H1
By Location

National Healthcare Safety Network
SIR for CLAB Data for CMS IPPS - By OrgID/Location

As of: March 23, 2012 at 3:04 PM
Date Range: CLAB_RATESALL summaryYH 2011H1 to 2011H1
if (((bsiPlan = "Y") AND (location IN ("2 MSICU", "MICU", "MSICU", "SICU"))))

Org ID=10018

Org ID	Location	Summary Yr/Half	Months	infcount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2 MSICU	2011H1	5	1	2.415	1150	0.414	0.3052	0.010, 2.307
10018	MICU	2011H1	6	9	3.198	1230	2.814	0.0057	1.287, 5.342
10018	MSICU	2011H1	5	3	2.514	1197	1.193	0.4598	0.246, 3.487
10018	SICU	2011H1	6	2	2.270	987	0.881	0.6040	0.107, 3.183

Calculating the Number Expected

Number expected = # central line days * (NHSN pooled mean/1000)

Location	infcount	Number Expected	Central Line Days	NHSN Pooled Mean	SIR	SIR p-value	95% Confidence Interval
2MSICU	**1**	**2.415**	**1150**	**2.1**	**0.414**	**0.3052**	**0.010, 2.307**
MICU	9	3.198	1230	2.6	2.814	0.0057	1.287, 5.342
MSICU	3	2.514	1197	2.1	1.193	0.4598	0.246, 3.487
SICU	2	2.27	987	2.3	0.881	0.604	0.107, 3.183

1150 central line days in the 2MSICU * (2.1/1000)

= 2.415 expected CLABSIs in the 2MSICU

Calculating the SIR - Overall

Number expected = # central line days * (NHSN pooled mean/1000)

Location	infcount	Number Expected	Central Line Days	NHSN Pooled Mean	SIR	SIR p-value	95% Confidence Interval
2 MSICU	1	2.415	1150	2.1	0.414	0.3052	0.010, 2.307
MICU	9	3.198	1230	2.6	2.814	0.0057	1.287, 5.342
MSICU	3	2.514	1197	2.1	1.193	0.4598	0.246, 3.487
SICU	2	2.27	987	2.3	0.881	0.604	0.107, 3.183
TOTAL	**15**	**10.397**	**4564**	**-------**	**1.443**		

- **Although we have the total # of CLABSIs and the total # central line days, an overall rate should <u>not</u> be calculated.**

Calculating the SIR - Overall

Number expected = # central line days * (NHSN pooled mean/1000)

Location	infcount	Number Expected	Central Line Days	NHSN Pooled Mean	SIR	SIR p-value	95% Confidence Interval
2 MSICU	1	2.415	1150	2.1	0.414	0.3052	0.010, 2.307
MICU	9	3.198	1230	2.6	2.814	0.0057	1.287, 5.342
MSICU	3	2.514	1197	2.1	1.193	0.4598	0.246, 3.487
SICU	2	2.27	987	2.3	0.881	0.604	0.107, 3.183
TOTAL	**15**	**10.397**	**4564**	**-------**	**1.443**	**-----**	**-------**

The infection count, central line days, and number of expected infections are summed.

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807 , 2.380

Calculating the SIR - Overall

Number expected = # central line days * (NHSN pooled mean/1000)

Location	infcount	Number Expected	Central Line Days	NHSN Pooled Mean	SIR	SIR p-value	95% Confidence Interval
2 MSICU	1	2.415	1150	2.1	0.414	0.3052	0.010, 2.307
MICU	9	3.198	1230	2.6	2.814	0.0057	1.287, 5.342
MSICU	3	2.514	1197	2.1	1.193	0.4598	0.246, 3.487
SICU	2	2.27	987	2.3	0.881	0.604	0.107, 3.183
TOTAL	**15**	**10.397**	**4564**	**-------**	**1.443**	**-----**	**-------**

The overall SIR is not a sum of the individual SIRs, but rather is calculated by:

Total infection count/ total expected count

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807, 2.380

CLABSI SIR for ICUs – 2011H1 By Location

Location	Summary Yr/Half	Months	infcount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
2 MSICU	2011H1	5	1	2.415	1150	0.414	0.3052	0.010, 2.307
MICU	2011H1	6	9	3.198	1230	2.814	0.0057	1.287, 5.342
MSICU	2011H1	5	3	2.514	1197	1.193	0.4598	0.246, 3.487
SICU	2011H1	6	2	2.270	987	0.881	0.6040	0.107, 3.183

- **CLABSI SIRs by Location allow you to assess contributions to the overall SIR for each time period.**
- **This table also allows you to determine if there are any months or locations missing from the overall SIR.**

QUESTION 11

Based on the information in this table, which location 's data are you most concerned about?

1. 2MSICU
2. MICU
3. MSICU
4. SICU

Location	Summary Yr/Half	Months	infcount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
2 MSICU	2011H1	5	1	2.415	1150	0.414	0.3052	0.010, 2.307
MICU	2011H1	6	9	3.198	1230	2.814	0.0057	1.287, 5.342
MSICU	2011H1	5	3	2.514	1197	1.193	0.4598	0.246, 3.487
SICU	2011H1	6	2	2.270	987	0.881	0.6040	0.107, 3.183

Notes for our meeting…

- **Although the CLABSI SIR for the ICUs, January – June 2011, indicates that we observed about 44% more infection than the national, based on statistical evidence our experience is no different than the national baseline.**
- **We looked at the CLABSI SIRs for each ICU for the same time period and noticed that there were significantly more CLABSIs in the MICU than what would be expected, based on national data**

Background notes for our meeting

- The SIR is a summary measure that, through indirect standardization, compares the number of CLABSIs observed in our ICUs with the number expected.
- The number of expected CLABSIs is calculated based on the types of locations we have reported and the NHSN pooled means published in 2009 (also referred to the as the "baseline data")

SIRs for CAUTI

- The CAUTI SIR is calculated using the same methodology described for CLABSI
- There are options to run an SIR using either In-Plan CAUTI Data or ALL CAUTI Data

CAUTI SIR Data

Location Type	# CAUTI	Number Expected	Urinary Cath Days	NHSN Pooled Mean	SIR
Medical Cardiac ICU	2	0.76	380	2.0	.
Medical ICU	1	0.59	257	2.3	.
Med/Surg ICU	3	1.44	627	2.3	2.083
NeuroSurg ICU	2	3.13	712	4.4	0.639
TOTAL	**8**	**5.92**	**1976**	**-------**	**1.35**

- **The formula for calculating the number of expected CAUTI infections is:**

  # urinary catheter days *(NHSN Rate/1000)

- **The formula for the CAUTI SIR is:**

$$\text{SIR} = \frac{\text{\# of CAUTIs observed}}{\text{\# of CAUTIs expected}}$$

Summary

- **Analyzing your data in NHSN gives you the power to OWN your data and tell a story.**
- **There are various output options that can be modified to meet your needs and the needs of your facility.**
- **Obtaining rates and DU ratios from NHSN can help you assess how your facility compares to the latest NHSN pooled means.**

Additional Resources

- **More Analysis training: http://www.cdc.gov/nhsn/Training/analysis/index.html**
- **NHSN Annual Reports: http://www.cdc.gov/nhsn/dataStat.html**

Questions?
nhsn@cdc.gov

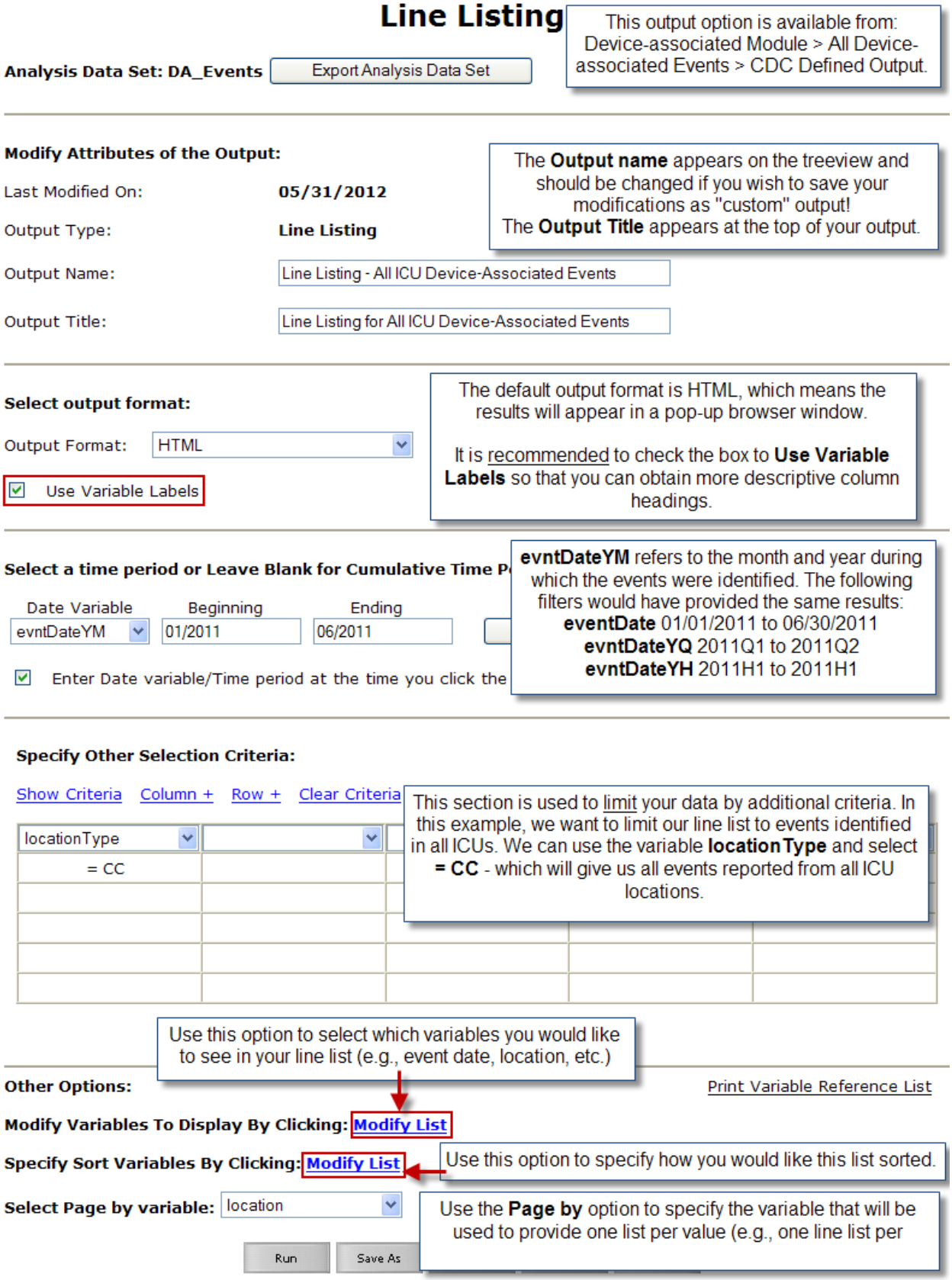
Introduction to NHSN Analysis: Focus on Device-associated Data

Analysis Modifications and Results

NHSN Training Course

October 2, 2012

Example #1: Line List – Device-associated Infections
Modifications to output option



Example #1: Line List – Device-associated Infections
RESULTS

National Healthcare Safety Network

Line Listing for All ICU Device-Associated Events

As of: June 25, 2012 at 8:11 AM

Date Range: DA_EVENTS evntDateYM 2011M01 to 2011M06

Location=71ICU

Event ID	Patient ID	Age on Event Date	Gender	Fac Admission Date	Event Date	Days: Admit to Event	Event Type	Specific Event	Location	Secondary BSI?
234794	12120380	0	F	01/05/2011	01/08/2011	4	UTI	SUTI	71ICU	N
234783	9782078	108	F	01/14/2011	01/17/2011	4	PNEU	PNU1	71ICU	N
234711	PKM7182647	68	F	12/27/2010	01/28/2011	33	BSI	LCBI	71ICU	
234795	02320380	23	F	01/28/2011	01/29/2011	2	UTI	SUTI	71ICU	N
234747	023840830	57	F	01/31/2011	02/03/2011	4	BSI	LCBI	71ICU	
234793	120837	34	M	02/09/2011	02/11/2011	3	UTI	ABUTI	71ICU	Y
234778	1281028301	52	M	02/20/2011	02/25/2011	6	PNEU	PNU2	71ICU	N
234791	0137070	85	F	03/05/2011	03/08/2011	4	PNEU	PNU3	71ICU	N
234757	07089H56476	85	F	03/06/2011	03/10/2011	5	BSI	LCBI	71ICU	
234748	2810829	41	F	03/15/2011	03/20/2011	6	BSI	LCBI	71ICU	
234749	9820K081	36	M	03/18/2011	03/21/2011	4	BSI	LCBI	71ICU	
234771	2970273120	54	F	03/20/2011	03/22/2011	3	BSI	LCBI	71ICU	
234780	0389034987	18	M	03/22/2011	03/23/2011	2	PNEU	PNU3	71ICU	N
19067	1045	62	M	08/31/2000	04/12/2011	3877	BSI	LCBI	71ICU	
158875	222331	55	M	04/12/2011	04/23/2011	12	UTI	ABUTI	71ICU	Y
158842	369369	73	F	04/26/2011	05/10/2011	15	BSI	LCBI	71ICU	
158869	111213	50	M	05/12/2011	05/16/2011	5	UTI	SUTI	71ICU	Y
158841	696693	71	M	05/01/2011	05/26/2011	26	BSI	LCBI	71ICU	
158915	646566	68	M	05/01/2011	05/29/2011	29	PNEU	PNU1	71ICU	N
19069	1051	62	M	05/16/2011	06/03/2011	19	BSI	LCBI	71ICU	
19056	1030	55	M	05/14/2011	06/13/2011	31	UTI	SUTI	71ICU	N

Sorted by eventDate

Data contained in this report were last generated on May 31, 2012 at 10:38 AM.

Example #2: CAUTI Rate Table
Modifications to output option

Analysis Rate Table

Analysis Data Set: CAU_RatesICU_SCA [Export Analysis Data Set]

This output option is available from: Device-associated Module > Urinary Catheter-associated UTI > CDC-Defined Output.

Modify Attributes of the Output:

Last Modified On: **05/31/2012**

Output Type: **Rate Table**

Output Name: 2011 CAUTI Rates in ICUs

Output Title: 2011 CAUTI Rates in ICUs

Select output format:

Output Format: HTML

☑ Use Variable Labels

summaryYR refers to the calendar year. The following filters would have provided the same results:
summaryYM 01/2011 to 12/2011
summaryYQ 2011Q1 to 2011Q4
summaryYH 2011H1 to 2011H2

Select a time period or Leave Blank for Cumulative Time

Date Variable	Beginning	Ending
summaryYr	2011	2011

[Clear Time Period]

☐ Enter Date variable/Time period at the time you click the Run button

Specify Other Selection Criteria:

Show Criteria Column + Row + Clear Criteria

location				
IN (2 MSICU, MICU, MSICU, SICU)				

Remember, this section is used to limit your data by additional criteria. In this example, we want to limit to 4 select ICUs. Notice that we used the **IN** operator, in order to select these ICUs in one step.

Other Options:

Group by: summaryYr

The **Group by** date variable will give us one rate per time period specified (e.g., one rate per calendar year). This variable does not have to match the date variable used above.

Print Variable Reference List

☐ Show Histogram

[Run] [Save As] [Reset] [Back] [Export Output Data Set]

Example #2: CAUTI Rate Table
RESULTS

National Healthcare Safety Network

2011 CAUTI Rates in ICUs

As of: June 25, 2012 at 8:54 AM

Date Range: CAU_RATESICU_SCA summaryYr 2011 to 2011

Org ID=10018 CDC Location=IN:ACUTE:CC:M

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	Cath Util Ratio	CathDU_Mean	Proportion p-value	Proportion Percentile
MICU	2011	12	6	3284	1.827	2.4	0.3086	50	4943	0.664	0.73	0.0000	26

Org ID=10018 CDC Location=IN:ACUTE:CC:MS

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	Cath Util Ratio	CathDU_Mean	Proportion p-value	Proportion Percentile
2 MSICU	2011	11	5	2776	1.801	2.2	0.4154	50	5919	0.469	0.73	0.0000	9
MSICU	2011	11	5	2735	1.828	2.2	0.4297	50	6066	0.451	0.73	0.0000	9

Org ID=10018 CDC Location=IN:ACUTE:CC:S

Location	Summary Yr	Months	CA UTI Count	Urinary Catheter Days	CA UTI Rate	NHSN CAU Pooled Mean	Incidence Density p-value	Incidence Density Percentile	Patient Days	Cath Util Ratio	CathDU_Mean	Proportion p-value	Proportion Percentile
SICU	2011	12	5	2369	2.111	3.0	0.2894	52	4450	0.532	0.76	0.0000	9

Example#3: CLABSI SIR for CMS IPPS – Select ICUs
Modifications to output option

Analysis SIR

Analysis Data Set: CLAB_RatesICU Export Analysis Data Set

This output option is available from: Advanced > Summary-level Data > CDC Defined Output.

Modify Attributes of the Output:

Last Modified On: **03/20/2012**

Output Type: **SIR**

Output Name: SIR - CLAB Data for CMS IPPS Select ICUS 2011H1

Output Title: SIR for CLAB Data for CMS IPPS

Select output format:

Output Format: HTML

☑ Use Variable Labels

The default output format is HTML, which means our results will appear in a pop-up browser window.

It is recommended that you check the box to "Use Variable Labels" so that you can obtain more descriptive column headings in your results.

Select a time period or Leave Blank for Cumulative Time Period:

Date Variable	Beginning	Ending
summaryYH	2011H1	2011H1

Clear Tir

☐ Enter Date variable/Time period at the time you click the Run bu

summaryYH refers to calendar half-years. **2011H1** includes Jan-June 2011. The following filters would provide the same results:
summaryYQ 2011Q1 to 2011Q2
summaryYM 01/2011 to 06/2011

Specify Other Selection Criteria:

Show Criteria Column + Row + Clear Criteria

bsiPlan	location
= Y	IN (2 MSICU, MICU, MSICU, SICU)

AND

This section is used to limit your data by additioanl criteria. In this example, we want to limit to 4 select ICUs, in addition to looking at those CLABSI that are considered "in-plan". Notice that the "IN" operator was used so that all criteria in both columns would be applied to our results.

Other Options:

Group by: summaryYH

The "Group by" variable will give us one SIR per time period specified (e.g., one SIR per half-year). This variable does not have to match the time variable used above.

Print Variable Reference List

Run | Save | Save As | Reset | Back | Publish | Export Output Data Set

Example #3: CLABSI SIR for CMS IPPS – Select ICUs
RESULTS

National Healthcare Safety Network

SIR for CLAB Data for CMS IPPS - By OrgID

As of: May 15, 2012 at 9:30 AM

Date Range: CLAB_RATESALL summaryYH 2011H1 to 2011H1

if (((bsiPlan = "Y") AND (location IN ("2 MSICU", "MICU", "MSICU", "SICU"))))

Org ID=10018

Org ID	Summary Yr/Half	infCount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2011H1	15	10.397	4564	1.443	0.1056	0.807, 2.380

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.

Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.

SIR excludes those months and locations where device days are missing.

Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805

Data contained in this report were last generated on May 11, 2012 at 2:57 PM.

National Healthcare Safety Network

SIR for CLAB Data for CMS IPPS - By OrgID/Location

As of: May 15, 2012 at 9:30 AM

Date Range: CLAB_RATESALL summaryYH 2011H1 to 2011H1

if (((bsiPlan = "Y") AND (location IN ("2 MSICU", "MICU", "MSICU", "SICU"))))

Org ID=10018

Org ID	Location	Summary Yr/Half	Months	infcount	Number Expected	Central Line Days	SIR	SIR p-value	95% Confidence Interval
10018	2 MSICU	2011H1	5	1	2.415	1150	0.414	0.3052	0.010, 2.307
10018	MICU	2011H1	6	9	3.198	1230	2.814	0.0057	1.287, 5.342
10018	MSICU	2011H1	5	3	2.514	1197	1.193	0.4598	0.246, 3.487
10018	SICU	2011H1	6	2	2.270	987	0.881	0.6040	0.107, 3.183

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.

Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.

SIR excludes those months and locations where device days are missing.

Source of aggregate data: NHSN Report, Am J Infect Control 2009;37:783-805

Data contained in this report were last generated on May 11, 2012 at 2:57 PM.

Please place tab here with the number and title 6. CLABSI Case Studies: Audience Response. Presentation should be double sided, black and white, and 2 slides per page.

Applying NHSN Central Line Associated Bloodstream Infection Criteria

Case Studies

Katherine Allen-Bridson, RN, BSN, MScPH, CIC,
Centers for Disease Control and Prevention

Ground Rules for Case Studies

- Purposes:
  - Training on use of definitions AS THEY EXIST
  - Optimize inter-rater reliability and data quality
- Surveillance ≠ clinical
- Examples highlight new criteria, common errors and difficult issues

Remember: Today's discussion is not to debate the correctness of the definitions but to learn how to correctly use them.

2

Investigating a Positive Blood Culture

Ask yourself questions in this order*:
1. Is it POA or an HAI? If POA, stop.
2. If this is an HAI, which site-specific criterion is met?
3. Is this a device-associated HAI? 3a. If LCBI, is it primary or secondary?
4. Attributable to what location/facility/procedure?

* You may choose to determine earlier if the patient had a central line or was in a location for which you are performing CLABSI surveillance.

Ms. A.

- **April 1: Ms. A is transferred to your facility with pancreatic cancer and a PICC which is first accessed on Day 1.**
- **April 7: Blood culture collected on April 5th is growing *Providencia stuartii*. No other pathogens isolated. Patient started on antibiotics.**
- **Additional laboratory values as follows:**

Admission Date ↓ **Blood culture collected** ↓ **Result reported** ↓

	Apr 1	Apr 2	Apr 3	Apr 4	Apr 5	Apr 6	Apr 7
WBC	900	800	600	400	600	700	800
ANC	---	---	---	---	400	---	600

Does patient meet criteria for an HAI?

What specific type of HAI does Ms. A have?

A. LCBI 1
B. LCBI 2
C. MBI-LCBI 1
D. MBI-LCBI 2

Is the CLABSI attributed to your facility or the transferring facility?

A. Your facility since the device was accessed there.
B. The transferring facility where the line was placed.

Mr. B.

- A 73 year old Caucasian male admitted to the ER on 6/10 with nausea and vomiting, abdominal pain and fever.
- History: Hypertension, hiatal hernia, esophageal reflux.
  Admission Vital Signs & Labs: BP 153/73, P 69, T 38.0, Amylase 4,900, Lipase 4000, BUN 18, Cr. 1.8, WBC 22.7, HCT 39. CT suggestive of pancreatitis
- 6/10:Admitted to the Medical ICU.
- Diagnosis: Pancreatitis

7

Mr. B. Continued

Date	Temp	Diagnostic Findings
6/10	102 F	NG tube placed, NPO, IV fluids and supportive care. Blood cultures x 2.
6/13	Afebrile	Poor peripheral access, TPN, Central line placed (L subclavian), CXR verified position. Blood culture results from 6/10 negative. Transfer to 6 North Surgical (Medicine full)
6/15	Afebrile	CHF (CXR shows fluid), Lasix administered to correct
6/16	Afebrile	Increased abdominal pain & vomiting, Levaquin & Flagyl started
6/27	Afebrile	TPN discontinued, PO intake tolerated.
6/30	Afebrile	Central line discontinued, transferred to 5 West Medical. DC'd levaquin & flagyl
7/1	100.8 F	Nausea, vomiting, Blood cultures X 2 collected.
7/2	Afebrile	1 blood culture bottle in one set, positive for *Staphylococcus epidermidis;* one bottle in other blood culture set positive for coagulase-negative staphylococcus. Vancomycin begun.
7/4	Afebrile	
7/11	Afebrile	Discharged

8

Mr. B.

If there is an infection is it POA or HAI?

What site-specific criteria would you consider?

Is it device-associated?

Mr. B.

6/10	6/13	6/30	7/1	7/2
Admit ICU	Transfer to 6N	Transfer to 5W		
	Central line inserted	Central line discontinued		
			100.8 F	
Blood cultures negative			Blood cultures: S. epidermidis and CNS	

Was a central line in place for > 2 days
Day of BSI= Day 1?
a) Was the central line in place at the time of the blood culture?
Or b) If CL discontinued was criterion for LCBI met on day of discontinuation or next day?

If there is/was a CLABSI to which unit should it be attributed?

A. Medical ICU
B. 5 West Medical
C. 6 North

Ms. C.

- 45-year-old female, with newly diagnosed stage IIB endometrial cancer, admitted to the Women's Center on 11/2 for a total abdominal hysterectomy, bilateral salpingo-oophorectomy and removal of pelvic and abdominal lymph nodes. Patient is also scheduled to have a PICC placed for participation in a clinical trial.
- **History:** 3 month history of new onset pelvic pain and dysmenorrhea. The patient has had two previous c-sections, the last one ten years ago.
- **Admission Vital Signs & Labs:** BP 117/70, P 82, T 36.0, WBC 5.2, HGB 8, HCT 29.

12

Ms. C.

Date	Temp	Diagnostic Findings
11/2	36.0°C	Nursing admission obtained; L arm PICC line placed in interventional radiology.
11/2		Patient typed and cross matched for 2 units packed RBC for treatment of anemia. Blood transfused through PICC.
11/3	Afebrile	Surgical procedure performed with no complications reported. Patient transported back to Women's Center from Post-op Recovery Unit.
11/4	Afebrile	Post-op antibiotics discontinued. Dressing changed on abdominal incision with no signs of erythema or drainage noted. Foley draining clear yellow urine.
11/5	Afebrile	Patient able to ambulate with assistance; Foley d/c'd. Dressing remains dry and intact. Patient reported first bowel movement post-op without difficulty. Patient medicated for abdominal pain (8 on 10 scale).
11/6	38.8°C	Patient continues to complain of abdominal pain unresolved with pain meds. Slight tenderness noted on palpation of L lower abdominal
11/7	39.0°C	Blood cultures collected x2. Patient sent for CT scan of the abdomen. Report notes: "abscess present in L lower abdominal cavity". Drain placed in the L lower abdominal cavity and cultures sent. IV placed and antibiotics started.

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Ms. C.

Date	Temp	Diagnostic Findings
11/9	37.8	Blood culture positive for VRE and *Bacteroides fragilis* x2 and abscess culture positive for *Bacteroides fragilis*. Patient reports decreased abdominal pain.
11/12	36	Drain removed. Abdominal sounds present. Follow-up CT scan reveals that intra-abdominal abscess is resolved. Patient discharged.

14

Does the patient have an HAI?

A. Yes, the patient has an HAI.
B. No, the patient does not have an HAI.
C. Not sure.

If so, what type of HAI?

A. The patient only has an intra-abdominal infection (IAB) with B. fragilis .
B. The patient has an organ/space SSI-IAB with *B. fragilis* and a CLABSI with VRE and *B. fragilis* .
C. The patient has an organ/space SSI-IAB with *B. fragilis* and VRE (the BSI is secondary to the IAB).
D. The patient has an organ/space SSI-IAB and a secondary BSI with *B. fragilis* and a CLABSI with VRE.
E. Not Sure.

Mr. D.

- **May 15:** **79 year old male, admitted with gastric cancer. Central line placed day of admission for total parenteral nutrition.**
- **May 16:** **Partial gastrectomy performed.**
- **May 21:** **Patient progressing well until fever spike of 101.3. Blood cultures sent.**
- **May 22:** **Increasing abdominal pain. CT Scan of abdomen shows small fluid collection posterior to stomach. Fluid collection fully drained by ultrasound guided needle aspiration and fluid sent for culture. Blood cultures repeated.**

HS

17

Mr. D. Continued

- **May 23:** **Blood cultures from May 21: 1 of 2 positive for *Staphylococcus epidermidis*. Abdominal fluid growing gram positive cocci. Antibiotics begun.**
- **May 24:** **Abdominal culture: *Enterobacter cloacae*. Blood cultures from May 22: 2 of 2 positive for coagulase-negative staphylococcus.**

If there is an infection is it POA or an HAI?

HS

18

Does this patient have a CLABSI?

A. Yes, the patient has a CLABSI with S. epidermidis.
B. No, the BSI is secondary to the abdominal infection.
C. Not sure.

Ms. E.

- 8/14 A 41 year old female presents to the Emergency Room in diabetic coma and with anemia. She has a subclavian catheter inserted in the Emergency Room. The next day, in the ICU, she has a midline catheter inserted and receives blood transfusions.
- 8/17 She develops fever of 39 C and shaking chills. Two sets of blood cultures sent.
- 8/19 Blood cultures positive for *Pseudomonas aeruginosa*. Neither insertion site shows inflammation and there is no other documented infection.

20

Is there an LCBI?

A. No, the patient does not have an LCBI.
B. Yes, the patient has an LCBI with *P. aeruginosa*
C. Not sure.

If so, which criterion of LCBI?

A. LCBI criterion 1 – recognized pathogen cultured from 1 or more blood cultures.
B. LCBI criterion 2 – with fever, chills and 2 or more positive blood cultures.
C. Not sure.

What unit should be indicated for the Location of Device Insertion field?

A. The ED should be recorded as the Location of Device Insertion.
B. The ICU should be recorded as the Location of Device Insertion.
C. Neither location.
D. Not sure.

Let's change this scenario and say that on 8/17 the patient's subclavian catheter site is red and has a small amount of pus present.

Does this change your decision?

A. No , this patient still has a CLABSI.
B. Yes, this is no longer a CLABSI.
C. Not sure.

Ms. F.

- **Ms. F. who is 10 years old, has been in PICU for a week with a central line in place the entire time. 4 months ago she received an allo-SCT for AML. Currently weighs 25kg.**
- **April 6: The line is pulled**
- **April 7: She becomes disoriented and hypotensive. Blood cultures x 2 and urine cultures are collected.**
- **1 blood culture is positive for *Streptococcus mutans* and the other is reported as Viridans Group Strep.**
- **Is this a BSI?**
- **If so, which criterion?**

Is it central line-associated?

A. No.
B. Yes.

Ms. F. Variation

- What if "GI GVHD" was documented?
- What if on April 4 she had 625 mL of diarrhea?

Ms. F: Variations continued

What if the second blood culture also grew

- Micrococcus?
- S. aureus?

Baby Z.

- **Day 1:** **One-day-old twin male infant admitted and emergently transferred to Neonatal Intensive Care Unit. Intubated during transport. Admitted with peripheral IV in scalp, IV fluid at 1cc/hr with Prostin (0.05mcg/kg/min) started prior to transport, and umbilical venous catheter present.**

- **Neonatal History: Gestational age = term infant, birth wt. 1810 grams, Apgars 5 & 6. An echocardiogram showed transposition of the great vessels of the heart.**

KB

29

Baby Z.

- Day 3: Repair of Patent Ductus Arteriosus and Atrial Septal Defect performed; later that day the umbilical catheter site was noted to be slightly red.

- Day 4: Umbilical catheter site remained slightly red and a low grade temperature developed.

- Day 5: 1 Blood culture set drawn through umbilical line; line was discontinued and the catheter tip sent for culture. PICC line placed.

30

Baby Z.

- Day 6: Continued elevated temp of 38.1 (rectal) and antibiotics were started.
- Day 7: Blood cultures were negative but the umbilical catheter tip was positive for *Staphylococcus epidermidis* >15 colonies. Antibiotics adjusted.

If this patient has an infection is it POA or an HAI?

Which criteria would you consider?

Would it be device associated?

31

Does this patient have an LCBI?

A. No, this patient does not have an LCBI.
B. Yes, this patient has an LCBI.
C. Not sure.

What if the catheter tip had been negative, but the blood culture was positive for *S. epidermidis*? Would the baby have an LCBI?

A. Yes, the baby has a CLABSI with S. epi.
B. No, this baby does not have an LCBI.
C. Not sure

If the patient had both the PICC and the umbilical line at the same time…how would her device-days be counted each day?

A. 1 central line day
B. 2 central line days
C. 1 umbilical line day
D. 1 central line day and 1 umbilical line day
E. Not sure

Ms. G.

- Ms. G. is a 7 year old admitted to the ICU from the E.R. on June 1, with 5 day history of fever, vomiting and diarrhea which became bloody 2 days ago. Patient's oral intake has been very small. Pulse is weak and thready, and patient is hypotensive.
- 6/1- Foley catheter and right subclavian central line placed in ER. Urine, stool and blood cultures collected. IV hydration begun.

KB

35

Ms. G. Continued

- 6/2- Occult blood in urine and output decreased. Lab reports stool culture growing, suspect *E. coli* 0157: H7
- 6/3- Patient experiencing very low urine output, which is grossly bloody. Moderate bruising present. Labs indicative of anemia, increased reticulocyte count. Left upper extremity PICC line placed. Hemodialysis begun and administrated by contract staff via dedicated PICC line. Fluids continue. Corticosteroid therapy begun.
- 6/4- *E. coli* 0157:H7 infection confirmed. Organism present in blood and stool. (This is a BSI present on admission.)

36

Ms. G. Continued

- 6/6- Hemodialysis , and supportive therapy continues. Labs stable except for slight increase in WBC to 11,700/mm^3.
- 6/10- Patient experiences BP fluctuations. Pressors instituted. WBC elevated since yesterday: 15,000/mm^3; Blood and urine collected for culture. Urinalysis performed: negative leukocyte esterase and nitrite. WBC: 2/hpf of spun urine.
- 6/11- Blood cultures positive 2 of 2 for MSSA. Urine culture no growth.

37

Does Ms. G. have an HAI?

A. Yes, this is a CLABSI with MSSA. It meets LCBI Criterion 1.
B. No, the patient had positive blood cultures on admission.
C. No, the patient had an infection at another site.

If so, is it attributable to your facility?

A. No, this should be attributed to the dialysis company since the care and maintenance of the HD was their responsibility.
B. Yes, this should be attributed to your facility because we are responsible for care provided by contracted staff/agencies.
C. Not sure.

Ms. G.

- What if Ms. G. had been transported from her patient room to an inpatient dialysis unit within your hospital each day for her dialysis.

40

Would such a CLABSI be attributable to the ICU or to the dialysis unit?

A. The CLABSI should be attributed to the dialysis unit since that's where her central line was most accessed.
B. The CLABSI should be attributed to the ICU, since the dialysis unit is not a "bedded " (inpatient) location.
C. Not sure.

Mr. H.

- 3/1 -Mr. H, a 66-year-old male is admitted to SICU following robotic assisted LIMA harvest and CBGB. During surgery, patient suffered a right ventricular injury which required a pump-assisted approach for repair. A left groin incision was made for this purpose. The ICD-9-CM code for this repair is 39.61. This is a non-operative procedure (NO) within NHSN. Central line placed in right subclavian vein.
- 3/3- Patient progressed well, and was transferred to Intermediate Care Unit with central line .

42

Mr. H.

- 3/5- Left groin incision with purulent drainage, redness and tenderness. Temp. 100.8 ° F. Groin wound drainage and blood cultures sent. Vancomycin begun.
- 3/6- Groin wound and blood (2 of 2) positive for gram positive cocci.
- 3/7- Both cultures positive for MSSA. Antibiotics changed to match sensitivities with 2nd generation cephalosporin.

43

Which of the following is true?

A. The patient has a superficial SSI and a CLABSI with MSSA. Both should be reported to NHSN.
B. The patient has a CLABSI with MSSA that should be reported to NHSN.
C. The patient has a SKIN infection with MSSA with a secondary BSI. The BSI would not be reported to NHSN.

What if the wound drainage was positive for MSSA, but the blood cultures (2 of 2) were positive for *Staphylococcus epidermidis* ?
Would the patient have an HAI and if so, what type(s)?

A. Yes, the patient has a superficial SSI with MSSA and a CLABSI with Staphylococcus epidermidis.
B. Yes, the patient has a SKIN with MSSA and a secondary BSI with *Staphylococcus epidermidis.*
C. Yes, the patient has a SKIN with MSSA and a CLABSI with *Staphylococcus epidermidis.*
D. Not sure.

Mr. I.

- 55-year-old male brought to the ED on 6/17 with multiple injuries from a motor vehicle accident. IV catheters (18g) were inserted (R) forearm and (L) forearm by EMS. Normal saline at 80 ml/hr infusing through each line. Foley cath inserted.
- PMH: L inguinal hernia repair 2 years ago. IDDM.
- Admission Vital Signs & Labs: BP 115/62, Temp.98.8 , P 110, Na 134, K 3.4, BUN 16, Glucose 220, Cr. 0.5, WBC 8.4, HGB 14.5, HCT 44, Urine yellow and hazy. Urinalysis microscopic 40-50 RBC and few WBC/HPF. Protein slightly positive.

CS

46

Mr. I.

- To OR on 6/17. Surgical Procedures: performed: ORIF L femur, splenectomy, repair of small bowel. Duration: 5 hr, 35 min., primary closure, general anesthesia. ASA class 4E, wound class contaminated (III).

47

Mr. I.

DATE	TEMP	DIAGNOSTIC FINDINGS
6/17/10	99.0	All dressings CDI. Foley catheter draining clear yellow urine. NG tube in place. Pt. on pain pump
6/18/10	99.6	Central line inserted in L IJ. Dressings CDI Foley draining clear yellow urine.
6/19/10	99.0	TPN started. Dressings changed. Wounds look ok. Foley draining clear yellow urine.
6/20-6/25	99.2 max	Pt continues to improve
6/26	101.2	Pt still receiving TPN. Pt. pan cultured. Urine hazy. Urinalysis 20-30 WBC/HPF. C/O 2 sets of Blood Cultures drawn. 1 from Central Line and other from R arm. Central Line pulled and antibiotics started.
6/27	100.0	Urine culture from 6/26 positive. GNR >100,000 CFU/ML, BCs no growth so far.
6/28	99.2	Urine GNR ID-*P. aeruginosa*. Blood culture from central line positive for *Corynebacterium xerosis*, set from R arm positive for coagulase-negative Staphylococcus.
7/1	98.0	Foley d/c and patient transfer to inpatient rehab

48

Does the patient have an HAI?

1. No, the patient does not have an HAI.
2. Yes, the patient has an HAI.
3. Not sure.

If so, which type of HAI?

A. The patient only has a CLABSI with C. xerosis.
B. The patient has a SUTI with *P. aeruginosa* and a CLABSI with *C. xerosis.*
C. The patient only has a SUTI with *P. aeruginosa*.
D. The patient has a SUTI with both *P. aeruginosa* and *C. xerosis.*

-

Baby X.

- 10/ 3: A 2 week old , 26-week gestational age infant is transferred from another hospital to your level II/III nursery with a right lower extremity PICC in place. Baby was weaned from the ventilator 2 days prior to transfer and now remains on 2 liters of oxygen by hood.

KB

51

Baby X.

- 10/5: 36 hours after transfer to your facility, the baby is irritable, and his respiration rate has slowly increased from admission rate of 46/min to current rate of 80/min. He has nasal flaring and chest retractions. Heart rate high at 165 bts/min. Rales are present in the right lung. Desaturations to 88% are noted. Oxygen is increased to 4 liters. A chest x-ray reveals probable pneumatoceles in the lower right lung. 1 set of blood cultures are collected through the PICC line and empiric antibiotics begun.

52

Baby X.

- 10/6: CXR shows probable pneumatoceles in RLL. WBC : 3500/mm^3.
- 10/7: Blood cultures reveal *Acinetobacter baumanii*.

53

Which of the following is true?

A. This is not a primary BSI; it is secondary to an infection at another site (pneumonia). The secondary BSI would not be reported to NHSN.
B. This is a primary BSI (CLABSI) and should be reported to NHSN.
C. This is a secondary BSI and should be reported to NHSN.

Should an HAI be attributed to your hospital or to the transferring facility ?

A. The HAI should be attributed to your hospital.
B. The HAI should be attributed to the transferring facility.
C. The HAI should not be attributed to either facility.
D. Not sure.

Ms. Y.

- **4/5: Ms. Y. a 50 year old patient, has been on the unit for 7 days receiving induction chemotherapy for Diffuse Large B Cell Lymphoma and has had a central line throughout. Because of tachycardia she has blood cultures x2 drawn. No other signs/symptoms.**
- **4/7: 1 set grows *Bacillus cereus and Bacteroides fragilis*. 1 bottle from the second set is positive for *Bacteroides fragilis and* and *E. coli*.**

Case 4: Laboratory information

Admission ↓ Positive blood culture collected ↓

	Mar 29	Mar 30	Mar 31	Apr 1	Apr 2	Apr 3	Apr 4	Apr 5	Apr 6
WBC	3000	2000	1500	1000	700	500	350	200	200
ANC	2500	1500	7500	500	350	200	100	50	60

	Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1	Day +2
ANC or WBC < 500?					X	X	X	X	X

Which of the following is true?

1. No LCBI criteria are met.
2. Patient has an LCBI-1 with *Bacillus cereus, Bacteroides fragilis*, and *E. coli reported*.
3. Patient has an MBI-LCBI 1with *B. fragilis* and *E. coli* reported only.
4. Patient has an MBI-LCBI 2 with only *Bacillus cereus* reported.

Please place tab here with the number and title 7. HAI Definition and CAUTI.
Presentation should be double sided, black and white, and 2 slides per page.

Using the National Healthcare Safety Network for CAUTI Surveillance

October 2, 2012

Janet Brooks, RN, BSN, CIC
Nurse Consultant
Centers for Disease Control and Prevention
Division of Healthcare Quality Promotion

Nothing to Disclose

Objectives

- Review requirements for catheter-associated urinary tract infection (CAUTI) reporting to CMS through NHSN
- Accurately apply the CDC/ NHSN definitions and criteria for CAUTI
- Recognize the method to identify denominators for CAUTI rate calculations
- Define key terms

Agenda

- CAUTI epidemiology
- CMS Operational Guidelines for Reporting CAUTI
- Surveillance tips
- NHSN CAUTI definition and new changes
- Denominator collection
- Resources for CAUTI surveillance
- Case studies

CAUTI Epidemiology

- Urinary tract infection is tied with pneumonia as the second most common type of healthcare-associated infection, second only to SSIs[1]
- UTIs account for more than 15% of infections reported by acute care hospitals
- Majority of UTIs associated with indwelling catheters
- Leading cause of secondary BSI with ~10% mortality
- Each year, more than 13,000 deaths are associated with UTIs [2]
- One-third of antimicrobial use inappropriately aimed at treatment of asymptomatic bacteriuria

[1]*Magill SS, Hellinger W, et al. Prevalence of healthcare-asociated infections in acute care facilities. Infect Control Hosp Epidemiol. 2012;33(3):283-91.*
[2]*Klevens RM, Edward JR, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. Public Health Reports 2007;122:160-166.*

CMS Reporting via NHSN – Current Requirements

HAI Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and Abdominal Hysterectomy	January 2012
I.V. antimicrobial start	Dialysis Facilities	January 2012
Positive blood culture	Dialysis Facilities	January 2012
Signs of vascular access infection	Dialysis Facilities	January 2012
CLABSI	Long Term Care Hospitals *	October 2012
CAUTI	Long Term Care Hospitals *	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA Bacteremia	Acute Care Hospitals	January 2013
C. difficile LabID Event	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	ASCs	October 2014
SSI *(TBD)*	Outpatient Surgery/ASCs	TBD
* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN		

NHSN and CMS Long Term Acute Care and Inpatient Rehabilitation Facilities

- *Long Term Care Hospitals (LTCHs) and Inpatient Rehabilitation facilities (IRF) are required to report CAUTI to CMS via CDC's NHSN beginning October 1, 2012 for <u>all</u> inpatient locations
- NHSN modified to include separate facility surveys specific to LTCH and IRFs

Long Term Care Hospitals are called Long Term **Acute** Care Hospitals in NHSN

NHSN and CMS
Long Term Acute Care and Inpatient Rehabilitation Facilities

- Each LTAC and IRF with a separate CCN number must enroll in NHSN as a separate facility
- Map each of their inpatient locations to the appropriate CDC-defined location type
- All other operational guidelines described with Acute Care guidance

NHSN and CMS

- Must follow the NHSN CAUTI protocol exactly and report complete and accurate data in a timely manner
- CMS reportable data must be included in monthly reporting plans
- Does not preempt any state mandates for CAUTI reporting to NHSN
- Non-compliance results in denial of annual payment update

NHSN and CMS

- CAUTI reporting includes reporting of
  - Denominator data (patient days and indwelling urinary device days)
  - Symptomatic CAUTIs (SUTIs)
  - Asymptomatic bacteremic UTIs (ABUTIs) that are catheter associated

NHSN and CMS

- Data must be reported to NHSN by means of manual data entry into NHSN web-based application or via file imports using the Clinical Document Architecture (CDA) file format
- Data must be submitted monthly (within 30 days of the end of the month in which it is collected) so it has the greatest impact on infection prevention activities
- For data to be shared with CMS, each quarter's data must be entered into NHSN no later than 4 ½ months after the end of the quarter
  - Q1 (January-March) data must be entered into NHSN by August 15; Q2 by November 15; Q 3 by February 15, and Q4 by May 15 (data is frozen at 00:00 on the 16th)

NHSN and CMS

- CDC will provide the following hospital specific data:
  - number of observed CAUTIs
  - number of expected CAUTIs calculated using NHSN database
  - number of indwelling urinary catheter days
  - hospital-specific CAUTI standardized infection ratio (SIR)
  - 95% CI

http://www.cdc.gov/nhsn/PDFs/FINAL-ACH-CAUTI-Guidance.pdf

NHSN and CMS

- Hospitals can view their own HAI summary statistics at a secure CMS website where the Annual Payment Update Dashboard is posted

http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetBasic&cid=1228694346716

CAUTI Prevention and Control begins with surveillance. Gotta have data!!!

Customize Chart Review Process for You/Your Facility

Questions to ask/explore:

- What computer databases does the facility have? (lab, pharmacy, ADT, etc.)
- Is the medical record paper, on-line or both? What is available where?
- Where do I obtain the information needed to assess the criteria?
- Do I have access to the information I need? If not, how do I get access? Develop a collaborative relationship with someone in IT who knows the data bases.

Chart Review Process

- Organize: What am I going to look at first and where is it in the record?

1. Urine culture positive (lab data base)

2. Indwelling urinary catheter in place within criteria? (Nursing documentation? Graphic sheet?)

Sample Work Sheet to Help With Chart Abstraction

Stay focused; don't start wandering!

NHSN
National Healthcare Safety Network

OMB No. 0920-0666
Exp. Date: 01-31-2015
www.cdc.gov/nhsn

Urinary Tract infection (UTI)

Page 1 of 4

*required for saving **required for completion

Facility ID:	Event #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
*Event Type: UTI	*Date of Event:
Post-procedure UTI: Yes No	Date of Procedure:
NHSN Procedure Code:	ICD-9-CM Procedure Code:

*MDRO Infection Surveillance:

☐ Yes, this infection's pathogen & location are in-plan for Infection Surveillance in the MDRO/CDI Module

☐ No, this infection's pathogen & location are **not** in-plan for Infection Surveillance in the MDRO/CDI Module

*Date Admitted to Facility:	*Location:

Risk Factors

*Urinary Catheter status at time of specimen collection or onset of signs or symptoms:

☐ In place ☐ Removed within 2 days prior ☐ Not in place nor within 2 days prior

Location of Device Insertion: _____ Date of Device Insertion: ____ /____ /_____

If NICU, birth weight (gms): _____

Event Details

*Specific Event: ☐ Symptomatic UTI (SUTI) ☐ Asymptomatic Bacteremic UTI (ABUTI) ☐ Other UTI (OUTI)

*Specify Criteria Used: (check all that apply)

Signs & Symptoms		Laboratory & Diagnostic Testing
Any Patient	≥ 1 year old	
☐ Fever	☐ Fever	☐ 1 positive culture with ≥ 10^5 CFU/ml with no more than 2 species of microorganisms
☐ Urgency	☐ Hypothermia	
☐ Frequency	☐ Apnea	☐ Positive dipstick for leukocyte esterase or nitrite
☐ Dysuria	☐ Bradycardia	☐ Pyuria
☐ Suprapubic tenderness	☐ Dysuria	☐ Microorganisms seen on Gram stain of unspun urine
☐ Costovertebral angle pain or tenderness	☐ Lethargy	☐ 1 positive culture with ≥ 10^3 CFU/ml and < 10^5 CFU/ml with no more than 2 species of microorganisms
☐ Abscess	☐ Vomiting	☐ Positive culture
☐ Pain or tenderness		☐ Positive blood culture
☐ Purulent drainage or material		☐ Imaging test evidence of infection
☐ Other evidence of infection found on direct exam, during invasive procedure, or by diagnostic tests[1]		[1] per specific site criteria

*Secondary Bloodstream Infection: Yes No

**Died: Yes No	UTI Contributed to Death: Yes No
Discharge Date:	*Pathogens Identified: Yes No *If Yes, specify on pages 2-4.

*Confidentiality: The information provided information does not in any circumstances permit direct patient identification or any individual information is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 306 and 308(d) of the Public Health Service Act (42 USC 242b, 242k, and 242m(d)).

Public reporting burden of this collection of information is estimated to average 32 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Reports Clearance Officer, 1600 Clifton Rd, MS D-74, Atlanta, GA 30333; ATTN: PRA (0920-0666).

CDC Ver. 1.1 (Form) Hide / v / 1

Your facility may create its own data collection form and collect additional data so long as the required NHSN data are captured.

Consistency is a Must!

- Standardized chart review helps with learning and time efficiency
- Maintain focus on criteria. Do not deviate from the process you have established
- Surveillance criteria is designed to look at a population at risk
- Identify patients meeting the criteria
- Consistently apply the criteria

Investigating an Infection

Ask yourself questions in this order:
1. Is it an HAI or POA? If POA, stop.
2. If an HAI, which site-specific criterion met?
3. Is this a device-associated HAI?
4. Attributable to what location/facility?

Surveillance definitions vs. Clinical Diagnosis

	Surveillance	Clinical
Focus	Population based	Patient based
Clinical Judgment	Minimally used	Essential
Purposes	• Identify trends • Establish baselines • Reporting purposes	• Diagnose • Inform treatment decisions

What If There is Clinical Disagreement?

- Surveillance vs. clinical definitions
  - Different purposes
  - May not agree
  - Report based on NSHN surveillance definitions
  - Comments section useful to note important factors
- Can submit questions to nhsn@cdc.gov

Key Terms

All CAUTIs Must be HAI

Key Terms

Present on Admission (POA)	An infection is considered POA if it occurs on the day of admission to the hospital or the next day and fully meets a CDC/NHSN site-specific infection criterion.
Healthcare-associated Infection (HAI)	An infection is considered an HAI if it occurs on or after the 3rd hospital day and meets a CDC/NHSN site-specific infection criterion. The onset of the HAI may occur during the initial 2-day period of hospitalization as long as the infection criterion is not fully met during that period.
Device-associated Infection	An infection is considered device-associated if the device has been in place for > 2 calendar days and meets a CDC/NHSN site-specific infection criterion. The onset of the infection may occur during the initial 2-day period of device placement as long as the infection criterion is not fully met during that period. Infections occurring on Day 1 or 2 following device discontinuation, with day of discontinuation = Day 1, are device-associated infections.
Onset of Infection	The onset of infection is the date when the first sign or symptom of infection (clinical evidence) appeared or the date the specimen used to meet the infection criterion was collected, whichever came first. Synonyms: infection date, infection onset, onset date, date of event
Transfer Rule	If an HAI develops ≤ 2 calendar days of transfer from one inpatient location to another in the same facility, it is attributed to the transferring location (i.e., it occurs on the day of transfer or the next day). Likewise, if an HAI develops ≤ 2 calendar days of transfer from one inpatient facility to another, it is attributed to the transferring facility. Receiving facilities should share information about such HAIs with the transferring facility to enable reporting. Day of transfer = Day 1

Key Term: Present on Admission (POA)

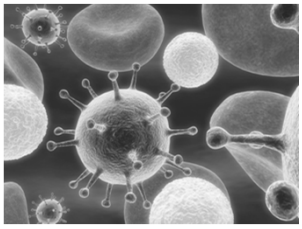
An infection is considered POA if it occurs on the day of admission to the hospital or the next day and fully meets a CDC/NHSN site-specific infection criterion.

Chapter 17 contains all the HAI site-specific criteria

Day 1	Day 2	Day 3	CAUTI:
Admit to ICU Foley inserted	ICU UTI criterion fully met	ICU	POA

Key Term: Healthcare-associated Infection (HAI)

An infection is considered an HAI if it occurs on or after the 3rd hospital day and meets a CDC/NHSN site-specific infection criterion. The onset of the HAI may occur during the initial 2-day period of hospitalization as long as the infection criterion is not fully met during that period.

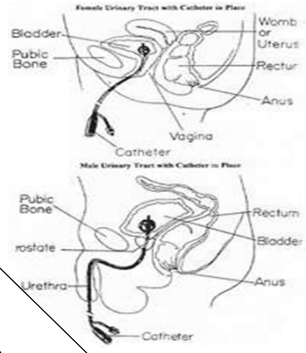


Day 1	Day 2	Day 3	Day 4	CAUTI:
Admit to ICU	ICU	ICU Infection onset	ICU	HAI
Admit to ICU	ICU Temp Spike	ICU Infection Criterion fully met	ICU	HAI

Key Term: Indwelling Catheter

A drainage tube that is inserted into the urinary bladder <u>through the urethra</u>, is left in place, and is connected to a collection system. This includes a collection system that is used for irrigation of any type or duration (e.g., intermittent, continuous).

- Also called a Foley catheter
- Does not include (among others):
  - Straight in and out catheters
  - Suprapubic catheters
  - Nephrostomy tubes



Also includes catheters that are changed from bed bags to leg bags and vice versa.

Key Term: CAUTI Device-associated Infection

Catheter-associated UTI (CAUTI): A UTI where an indwelling urinary catheter was in place for >2 calendar days, with day of device placement being Day 1,

and

An indwelling urinary catheter must be in place on the date of the event or the day before. Infections occurring on Day 1 or 2 following device discontinuation, with day of discontinuation = Day 1, are device-associated infections.

Day 1	Day 2	Day 3	CAUTI ?
5 West Foley placed	5 West Foley in place	5W Foley in place Infection criterion fully met	Yes
5 West Foley placed	5 West Foley in place UTI criteria fully met	5West Foley in place	No, but may be a UTI

Key Term: Onset of Infection

The onset of infection is the date when the first sign or symptom of infection (clinical evidence) appeared or the date the specimen used to meet the infection criterion was collected, whichever came first. Synonyms: infection date, infection onset, onset date, date of event

08/01	08/05	08/06	Date of Onset
Admit to ICU Foley inserted	ICU Foley in place Temp – 38.8 C	Urine specimen sent E. coli ≥10^5 CFU	08/05

Location of Attribution

CAUTIs are attributed to inpatient location at time of urine collection or sign/symptom onset, whichever comes first.

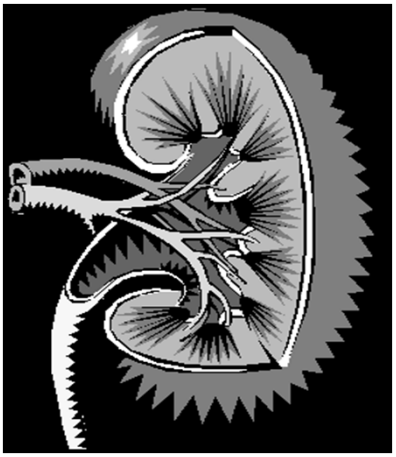
**Transfer Rule: If a CAUTI develops ≤ 2 calendar days of transfer from one inpatient location/facility to another, it is attributed to the transferring location/facility (i.e., it occurs on the day of transfer or the next day). Date of Transfer = Day 1*

Day 1	Day 2	Day 3	CAUTI to:
ICU ► 3W	3W CAUTI criterion fully met	3W	ICU
ICU ► 3W	3W	3W CAUTI onset	3W

Transfer Rule: Example

Patient is transferred from SICU to 5 West with a Foley on 08/10/12. On 08/11/12 patient has a fever of 38.2°C a urine culture is collected. Urine has ≥10^5 CFU/ml of *E. coli*. This CAUTI is attributed to the SICU.

CAUTI Criteria and Application



Urinary Tract Infection Definitions

There are two specific types of UTI that can be applied for identifying a CAUTI

- *Symptomatic UTI (**SUTI**)*
- *Asymptomatic Bacteremic UTI (**ABUTI**)*

Both types must be reported to comply with CMS reporting requirements.

Key Question for CAUTI Surveillance
Is this catheter associated?

Catheter-associated UTI (CAUTI): A UTI where an indwelling urinary catheter was in place for >2 calendar days, with day of device placement being Day 1,

and

An indwelling urinary catheter must be in place on the date of the event or the day before. Infections occurring on Day 1 or 2 following device discontinuation, with day of discontinuation = Day 1, are device-associated infections.

Admit	08/07	08/08	08/09	08/10	CAUTI ?
08/01	Foley placed	Foley in place Infection criterion fully met	Foley in place	Foley in place	Not a CAUTI, but may be an HAI UTI
08/01	Foley placed	Foley in place Infection onset	Foley in place Infection Criterion fully met	Foley in place	Yes, Infection criterion fully met on day 3
08/01	Foley placed	Foley removed	No Foley	Infection onset	Not a CAUTI, but may be an HAI UTI

SUTI Overview
Symptomatic Urinary Tract Infection

Must have symptoms AND **2** different criterion groups:

- **Criterion 1a** : Urine culture $\geq 10^5$ CFU/ml, no more than 2 species
- **Criterion 2a**: Urine culture $\geq 10^3$ and $<10^5$ CFU/ml, no more than 2 species, AND positive urinalysis (U/A)

Only Criteria 1a and 2a of SUTI apply to catheter-associated UTIs in adults.

Criteria 1b and 2b of SUTI apply to UTIs that are not catheter-associated.

SUTI Overview
Symptomatic Urinary Tract Infection

Criteria 3 & 4: Patients **<** **1** year of age; have age-specific signs and symptoms AND

- **Criterion 3:** Urine culture $\geq 10^5$ CFU/ml no more than 2 species

- **Criterion 4:** Urine culture $\geq 10^3$ and $< 10^5$ CFU/ml no more than 2 species AND positive U/A

Criteria 3 and 4 are infant-specific equivalents of 1 and 2.

No more than 2 species of microorganisms

Mixed flora and P. aeruginosa*: Laboratory specimens reported as mixed flora represent at least 2 species of organisms. Therefore any additional organism recovered from the same culture would be > 2 species of organisms.*

P. aeruginosa and P. stuartii *= 2 species*

MSSA and MRSA *= 1 species (report most resistant)*

Symptomatic UTI
SUTI 1a

1a	Patient had an indwelling urinary catheter in place for > 2 calendar days, with day of device placement being Day 1, and catheter was in place at the time of specimen collection or onset of signs and symptoms. ***and*** at least 1 of the following signs or symptoms: fever (>38 C), suprapubic tenderness*, or costovertebral angle pain or tenderness* ***and*** a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms. ----------OR---------- Patient had indwelling urinary catheter in place for > 2 calendar days and had it removed the date of or the day before specimen collection or onset of signs or symptoms ***and*** at least 1 of the following signs or symptoms: fever (>38 C), urgency*, frequency*, dysuria*, suprapubic tenderness, or costovertebral angle pain or tenderness* ***and*** a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms. * With no other recognized cause

Criteria Rationale
SUTI 1a
Catheter in place

Patient had an indwelling urinary catheter in place for > 2 calendar days, with day of device placement being Day 1, and catheter was in place at the time of specimen collection or onset of signs and symptoms.

Urgency, frequency and dysuria are not reliable indicators of UTI in this population therefore NOT included in criteria.

Criteria Rationale
SUTI 2a
Catheter removed

Patient had indwelling urinary catheter > 2 calendar days with removal the date of or the day before specimen collection or onset of signs or symptoms:

For this criterion urgency, frequency and dysuria are symptoms.

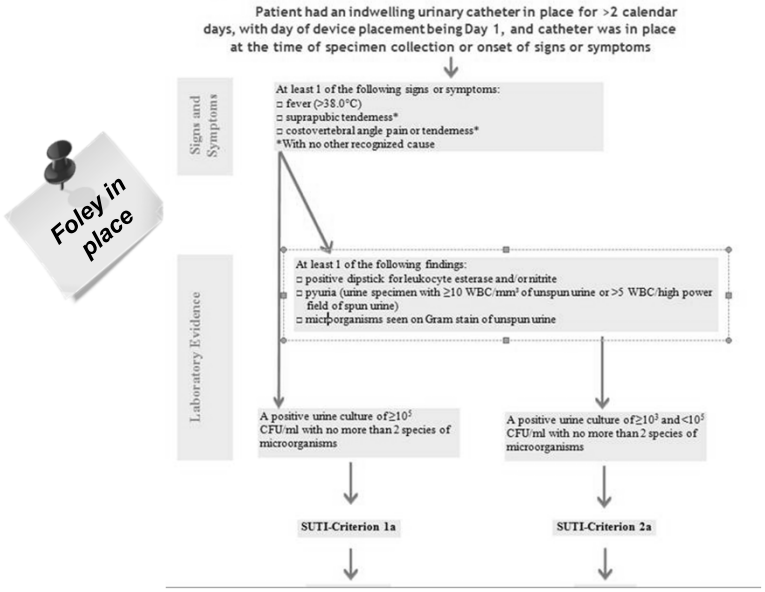
Day 1	Day 2	Day 3	Day 4	CAUTI?
Foley placed	Foley in place	Foley in place for part of day only	Infection onset	Yes
Foley placed	Foley removed	No Foley	Infection onset	No

Symptomatic UTI
SUTI 2a

2a	Patient had an indwelling urinary catheter in place for > 2 calendar days, with day of device placement being Day 1, and catheter was in place at the time of specimen collection or onset of signs and symptoms. ***and*** at least 1 of the following signs or symptoms: fever (>38 C), suprapubic tenderness*, or costovertebral angle pain or tenderness* ***and*** at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm3 of unspun urine or >5 WBC/high power field of spun urine) c. microorganisms seen on Gram stain of unspun urine ***and*** a positive urine culture of $\geq 10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms. **----------OR----------** Patient had indwelling urinary catheter > 2 calendar days and had it removed the date of or the day before specimen collection or onset of signs or symptoms ***and*** at least 1 of the following signs or symptoms: fever (>38 C), urgency*, frequency*, dysuria*, suprapubic tenderness*, or costovertebral angle pain or tenderness* ***and*** at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm^3 of unspun urine or >5 WBC/high power field of spun urine) c. microorganisms seen on Gram stain of unspun urine ***and*** a positive urine culture of $\geq 10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms. * With no other recognized cause

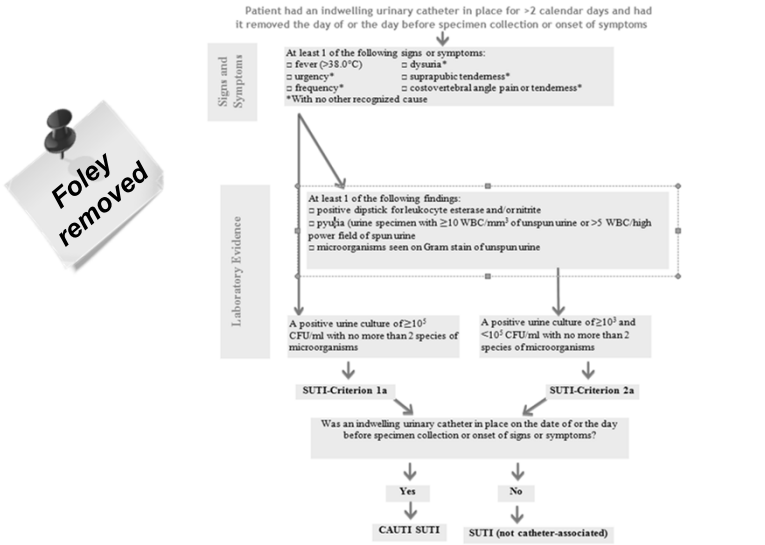
Flow Diagram SUTI 1a & 2a

Figure 1: Identification and Categorization of SUTI with Indwelling Catheter (see comments section page 7-6 thru 7-7 for important details)



Flow Diagram SUTI 1a & 2a

Figure 2: Identification and Categorization of SUTI Indwelling Catheter Discontinued in Prior 2 Calendar Days (see comments section page 7-6 thru 7-7 for important details)



Symptomatic UTI
Criteria 3 & 4 (***≤1 year old***)

3	Patient **≤1 year of age** with* or without an indwelling urinary catheter has at least 1 of the following signs or symptoms: fever (>38 C core), hypothermia (<36 C core), apnea*, bradycardia*, dysuria*, lethargy*, or vomiting* ***and*** a positive **urine culture of ≥10^5 CFU/ml** with no more than 2 species of microorganisms *With no other recognized cause
4	Patient **≤1 year of age** with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms: fever (>38 C core), hypothermia (<36 C core), apnea*, bradycardia*, dysuria*, lethargy*, or vomiting* ***and*** At least one of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm^3 of unspun urine or >5 WBC/high power field of spun urine) c. microorganisms seen on Gram's stain of unspun urine ***and*** a positive **urine culture of between ≥10^3 and <10^5 CFU/ml** with no more than two species of microorganisms *With no other recognized cause

*•*The indwelling urinary catheter was in place for > 2 calendar days prior to specimen collection or onset of signs or symptoms*

Asymptomatic Bacteremic UTI (ABUTI)

Patient *with* or without an indwelling urinary catheter* has **no signs or symptoms** (i.e., for any age patient, no fever (>38 C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness, **OR** for a patient ≤1 year of age, no fever (>38 C core), hypothermia (<36 C core), apnea, bradycardia, dysuria, lethargy, or vomiting)
and
a **positive urine culture of ≥10^5 CFU/ml** with no more than 2 species of **uropathogen microorganisms**** (see comments section below).
and
a **positive blood culture** with at least 1 matching uropathogen microorganism to the urine culture, or at least 2 matching blood cultures drawn on separate occasions if the matching pathogen is a common skin commensal.

*The indwelling urinary catheter was in place for > 2 calendar days, with day of device placement being Day 1, and catheter was in place on the date of or the day before specimen collection or onset of signs and symptoms.

****Uropathogen microorganisms** are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae,* and *Corynebacterium* (urease positive)[+].

[+]*Report Corynebacterium* (urease positive) as either *Corynebacterium species* unspecified or as *C. urealyticum* (CORIR) if so speciated.

Note: All ABUTIs will have a secondary bloodstream infection

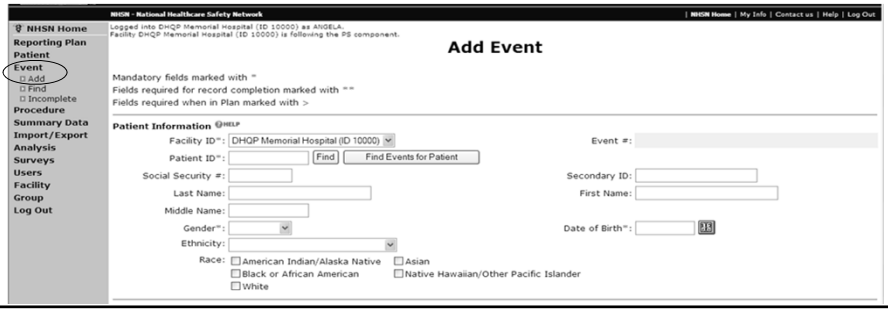
ABUTI

- **Note: Only events with catheters in place for > 2 calendar days prior to urine collection are catheter-associated.**

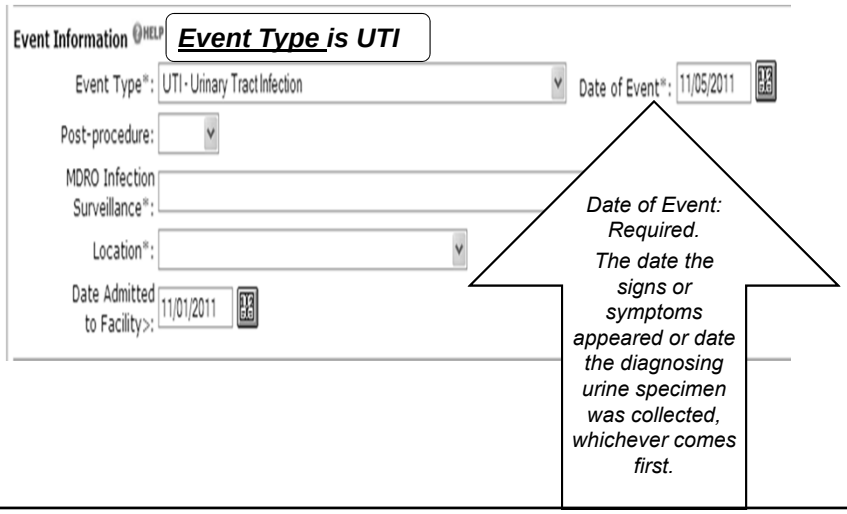
Entering CAUTI Events into NHSN (Numerator)

Patient Information

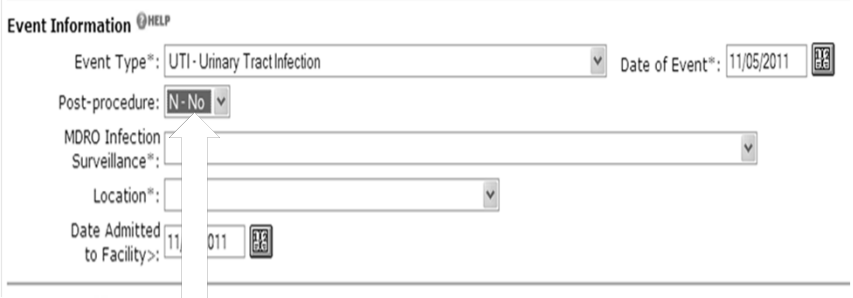
- The top section of UTI data collection form is used to collect patient demographics. Required fields have an asterisk (*).
- There are 4 *required* fields:
  - Facility ID
  - Patient ID
  - Gender
  - Date of Birth



Event Information
CAUTI

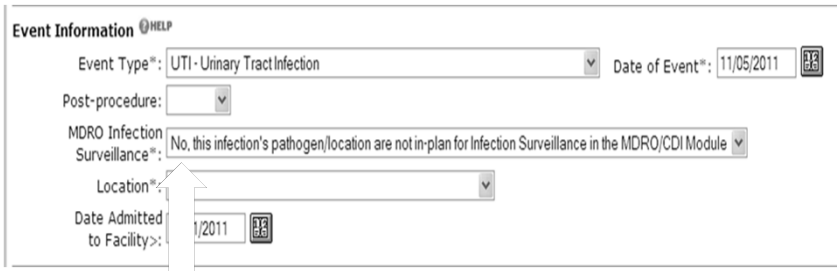


Event Information
CAUTI



Post-procedure UTI: Optional field. Mark "YES" if this event occurred after an <u>NHSN-defined</u> procedure but before discharge from the facility.

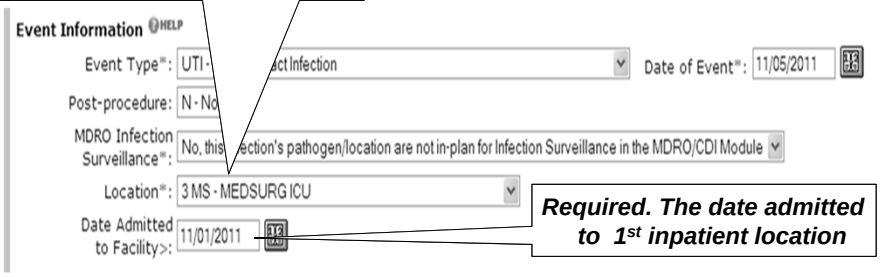
Event Information
CAUTI



MDRO Infection: Enter "YES" only if the facility's monthly reporting plan includes Infection Surveillance (NOT Lab ID Event) (MDRO/CDI Module) for both the involved pathogen and the location specified.

Event Information
CAUTI

Required. Enter patient location at the time of event onset.



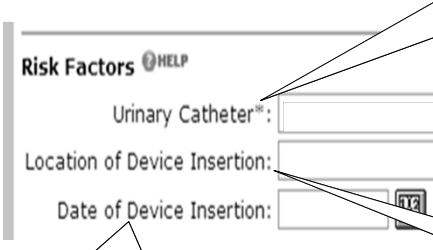
Required. The date admitted to 1st inpatient location

If the UTI develops in a patient within 2 calendar days of transfer from a location, indicate the transferring location, not the current location of the patient.

Risk Factors
CAUTI

Required Field: Three options:

- ***INPLACE- For 2 calendar days***
- ***REMOVE - Removed within 2 calendar days***
- ***NEITHER – Not in place nor within 2 calendar days prior to event onset***

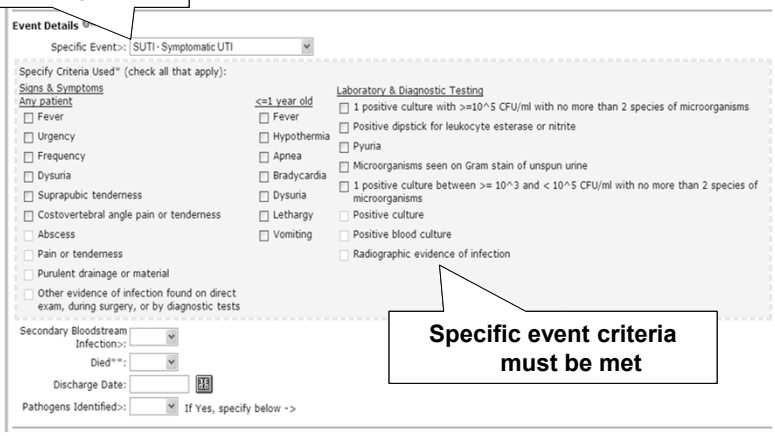


Optional: Patient location where indwelling urinary catheter inserted.

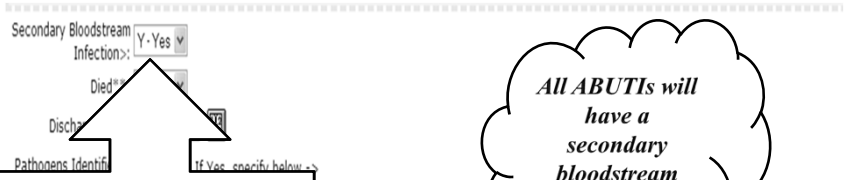
Optional: Date indwelling urinary catheter inserted.

Event Details: Specific Event

Available selections based on event type



Event Details: Secondary BSI



***Secondary BSI**: Required.*

*If the patient had a culture-confirmed bloodstream and a related/documented healthcare-associated UTI, select **Yes**.*

All ABUTIs will have a secondary bloodstream infection

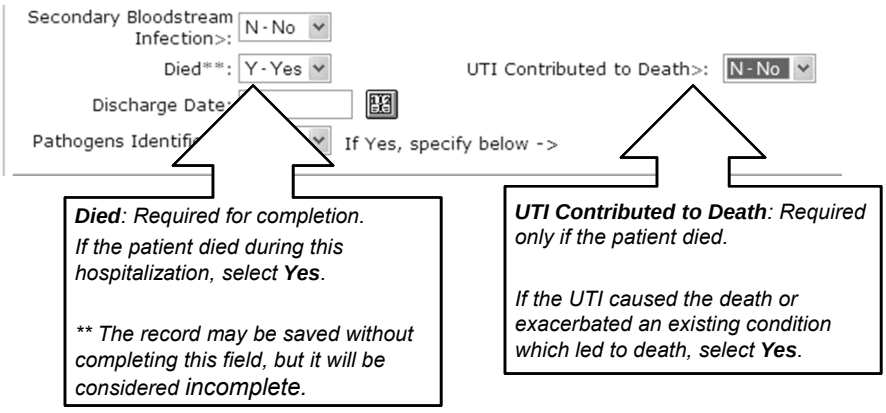
Secondary BSI

For UTI, at least one organism from the positive urine culture must match an organism in the blood culture *(antibiograms of the isolates do not have to match).*

Example: Patient grows E. coli in her urine and in her blood. The CAUTI is reported with Secondary BSI = Yes and the pathogen is E. coli.

http://www.cdc.gov/nhsn/PDFs/SecondaryBSIGuide_06_11.pdf

Event Details



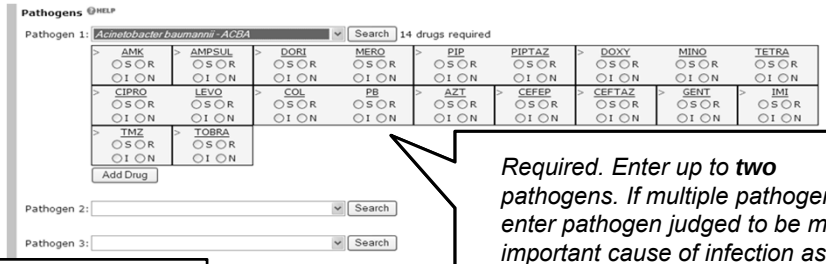
***Died**: Required for completion.*
*If the patient died during this hospitalization, select **Yes**.*

*** The record may be saved without completing this field, but it will be considered incomplete.*

***UTI Contributed to Death**: Required only if the patient died.*

*If the UTI caused the death or exacerbated an existing condition which led to death, select **Yes**.*

Event Details
Pathogens Identified

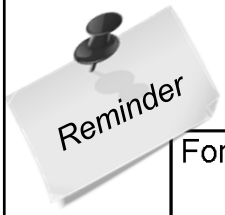


*Required. Enter up to **two** pathogens. If multiple pathogens, enter pathogen judged to be most important cause of infection as #1, the next most important as #2.*

S = Susceptible
I = Intermediate
R = Resistant
NS = Non-susceptible
S-DD = Susceptible-dose dependent
N = Not tested

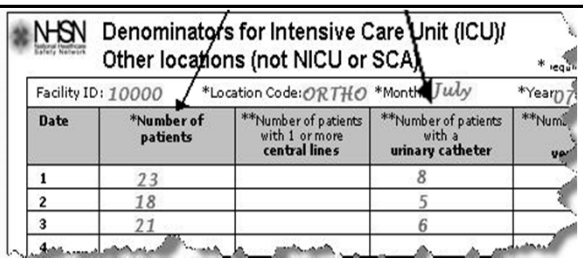
- ***Note: A UTI can have no more than 2 pathogens to meet the definition.***

Collecting Summary Denominator Data

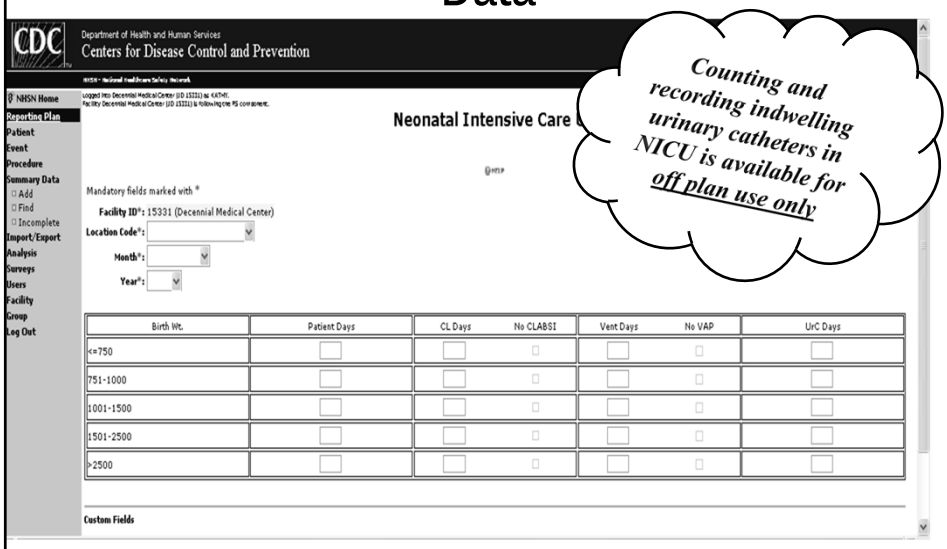


For all locations, count **at the same time each day**

- Number of patients on the unit
- Number of patients with an indwelling urinary catheter

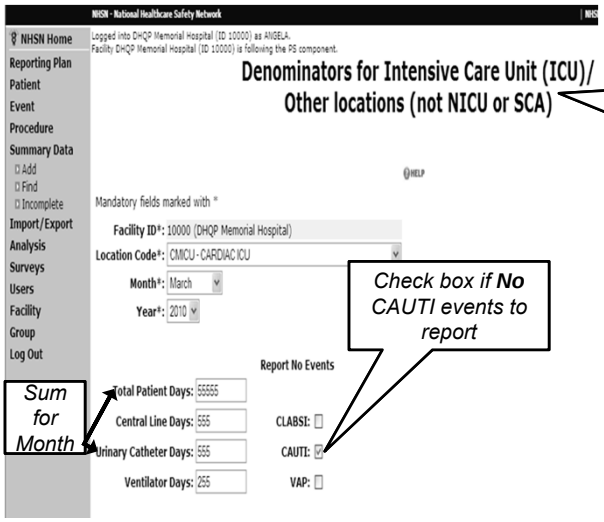


Collecting NICU Summary Data



Counting and recording indwelling urinary catheters in NICU is available for off plan use only

Summary Data Denominator



CAUTI summary data collection for SCAs is no different

*Check box if **No** CAUTI events to report*

Sum for Month

Alert Screen
Report No Events

Incomplete/Missing List

Incomplete Events | Missing Events | Incomplete Summary Data | Missing Summary Data | Incomplete Procedures | Missing Procedures | Missing Procedure-associated Events

In-plan denominators reported for these locations with no associated events

Print this report
Display All

First | Previous | Next | Last

Displaying 1 - 10 of 77

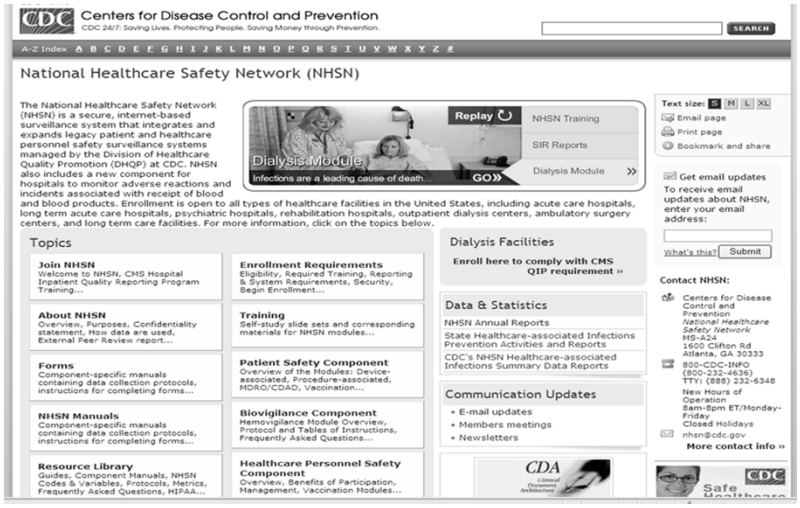
Location	CDC Location	Month/Year	Alert Type	Event Type/Pathogen	Summary Data Form Type	Report No Events
FACWIDEIN		01/2012	Summary but no events	LabID (All) - MRSA	MDRO	☐
FACWIDEIN		01/2012	Summary but no events	LabID (All) - VRE	MDRO	☐
INCARDCC	IN:ACUTE:CC:C	08/2011	Summary but no events	IS - MRSA	MDRO	☐
FACWIDEIN		07/2011	Summary but no events	LabID (All) - MRSA	MDRO	☐
INGI	IN:ACUTE:WARD:GI	07/2011	Summary but no events	IS - MRSA	MDRO	☐
INSCAHONC	IN:ACUTE:SCA:HONC	07/2011	Summary but no events	TCLAB	DA-SCA	☐
INSCAHONC	IN:ACUTE:SCA:HONC	07/2011	Summary but no events	PCLAB	DA-SCA	☐

Electronic Collection of Summary Data

Electronic capture of summary data is acceptable:

- *Following validation of the electronic method against the manual method*
  - *3 months concurrent data collection with both methods*
  - *Difference between methods must be within +/- 5% of each other*

Resources for NHSN



Resources for Surveillance

- NHSN Patient Safety Component Manual, January 2013
  - Ch 3: Monthly Reporting Plan
  - Ch 7: CAUTI Protocol
    (includes forms and their instructions)
  - Ch 16: Key Terms

http://www.cdc.gov/nhsn/TOC_PSCManual.html

Resources for Surveillance

- NHSN Forms
  - 57.106: Monthly Reporting Plan
  - 57.114: Urinary Tract Infection
  - 57.118 Denominators for Intensive Care Unit (ICU)/Other locations (not NICU or SCA)

Available Resources and Training

- Resource
  - CDC/HICPAC *Guideline for Prevention of Catheter-associated Urinary Tract Infections*[1]
- Training
  - Device-Associated Module
  - Pre-recorded Webinars
  - Lectoras

  http://www.cdc.gov/nhsn/training/

[1]*Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA. Guideline for prevention of catheter-associated urinary tract infections 2009. Infect Control Hosp Epidemiol. 2010;31(4):319-26.*

Available Training

- NHSN Enrollment & Facility Set-up
- Overview of the Patient Safety Component, Device-associated module
- Data Entry, Surveillance, Analysis, Import, and Customization
- Introduction to the Device-associated Module (Training Course with quiz)
- Catheter-associated Urinary Tract Infection (CAUTI) (Training Course with quiz)

http://www.cdc.gov/nhsn/training/

Email help desk: nhsn@cdc.gov

NHSN website:
http://www.cdc.gov/nhsn/

Please place tab here with the number and title 8. CAUTI Case Studies: Audience Response. Presentation should be double sided, black and white, and 2 slides per page.

Case Studies

Case Studies

- Purpose
  - Training on use of definitions based on the January 2013 NHSN Patient Safety Manual
  - Learn to accurately apply definitions
  - Surveillance ≠ Clinical
  - Optimize consistency in the application of the definitions
  - Improved data quality

Case 1

- Day 1: 50 year old patient with end stage pancreatic cancer with liver & bone mets admitted to hospital with advance directive for comfort care and antibiotics only; Foley catheter, peripheral IV and nasal cannula inserted.
- Day 4: Foley remains in place; patient is febrile to 38.0°C and has suprapubic tenderness; IV ampicillin started after urine obtained for culture.
- Day 5: difficulty breathing; CXR=infiltrate L lung base.
- Day 6: urine culture results = 10^5 CFU/ml *E coli.*
- Day 7: WBC/mm^3 = 3400; patchy infiltrates in both lung bases; continued episodes of dyspnea; rales noted in LLL.
- Day 11: Patient expired.

Does this patient have a UTI? If, so what type?

1. Yes. SUTI Criterion 1a.
2. Yes, SUTI Criterion 2a.
3. Yes, ABUTI.
4. No UTI.

Case 2

- 08/02/12 - 66 y.o. to OR for exploratory lap; Foley inserted in OR. Transferred to ICU post-op.
- 08/03/12 – patient stable, Foley in place.
- 08/04/12 patient noted to be febrile (38.9 C) and complained of diffuse abdominal pain. WBC increased to 19,000. He had cloudy, foul-smelling urine and urinalysis showed 2+ protein, + nitrite, 2+ leukocyte esterase, wbc – 10,000 mm3 and 3+ bacteria. Culture was 10,000 CFU/ml *E. coli*. The abdominal pain seemed localized to surgical area.

Is this a UTI? If so, what type?

1. No UTI
2. Yes, SUTI Criterion 1b.
3. Yes, SUTI Criterion 2a.
4. Yes, ABUTI.

Case 3

- Day 1: 58 year old patient is admitted to the ED with GI bleed. Foley inserted.
- Day 2: Patient spikes temp of 38.6°C Indwelling catheter remains in place. Urine specimen is sent.
- Day 3: Culture results 100,000 CFU/ml *Pseudomonas aeruginosa.*

Is this an HAI? If so, what type?

1. Yes, UTI but not a CAUTI because catheter had not been in for 2 calendar days.
2. No, it meets definition for Present on Admit
3. Yes, SUTI Criterion 1a

Case 4

- Day 1: 84 year old patient is admitted to LTAC with diabetic foot ulcer, indwelling catheter in place.
- Day 8: Indwelling catheter remains in place and no signs or symptoms of infection.
- Day 9: Patient becomes hypotensive, and CBC shows WBC of 15,000. Temp 38.0°C. Foot ulcer draining moderate amount of purulent drainage. Patient is pan-cultured. Blood culture and urine both grow *Streptococcus pyogenes* – urine >10^5 CFU/ml. Foot culture positive for *Pseudomonas aeruginosa*.

Is this a UTI? If so, what type?

1. No, because the blood seeded the urine and therefore there is no UTI.
2. Yes, ABUTI
3. Yes, SUTI Criterion 1a with secondary BSI

What if the organism in both cultures had been Micrococcus? Is it a UTI?

1. Yes. This is an ABUTI.
2. No, This is not an ABUTI.

Case 5

- 08/05/12 - 76 year-old woman is admitted from LTAC at 8 a.m. for surgical debridement of sacral decubitus. Medical history notable for severe rheumatoid arthritis and CHF. Routine admission U/A performed, positive for leukocyte esterase, and 3 WBC by HPF of spun urine. Patient afebrile, denies urinary urgency, frequency or pain. No suprapubic or CVA pain. Foley catheter and peripheral IV are inserted in OR.
- 08/06/12 - Wound care specialist documents wound clean. Temperature 37.4° C. Foley draining cloudy urine.
- 08/07/12 – Temp of 38.2°C. Foley removed. Encouraged to push p.o. fluids. Urine specimen sent to lab for culture and sensitivity.

Case 5

- 08/08/12 – Temp of 38.6°C. Patient complains of dysuria and pain with palpation to suprapubic area. Bactrim started.
- 08/09/12 - Urine culture positive for *E. coli 100,000 CFU/ml.* Patient afebrile. Preparing for discharge back to LTAC.

Does this patient have a UTI and is it a CAUTI?

1. No, UTI was present on admission
2. Yes, Patient has a SUTI 1a. and it is a CAUTI
3. Yes, Patient has a SUTI 1b. but it is not a CAUTI

Case 6

- 48 year old male involved in motorcycle accident. Closed head injury, multiple fractures. Taken to OR for ORIFs and evacuation of subdural hematoma. Foley catheter and left subclavian catheter placed in ED. Patient remains on ventilator placed in OR. Lungs clear bilaterally.
- 6 days postop, temp. 99.8°F, rhonchii in left lung base. CXR shows possible infiltrate/atelectasis in this area. Foley remains in place draining, clear yellow urine. Patient remains ventilated, sputum production increased.

Case 6

- Post op day 7: temp. 100.3°F; vent settings stable. No change to sputum production.
- Post op day 8: temp 101.9°F; lungs sounds clear; CXR clear. Patient on vent; Foley and central line remain in place. Pan cultures sent. Empiric antibiotic treatment begun.
- Post op day 9: Urine culture: 100,000 CFU/ml of *P. aeruginosa.* Sputum: *P. aeruginosa.* Blood culture: No growth. Physical assessment normal. No patient response to suprapubic or costovertebral angle palpation.

Does this patient have a UTI? If so, what type?

1. No UTI.
2. Yes, ABUTI.
3. Yes, SUTI 2a.
4. Yes, SUTI 1a.

Case 6 - continued

What if the patient had been afebrile, but had an elevated WBC and cloudy urine? Culture results were the same.

Would the patient have a UTI?

Would the patient have a UTI?

1. No UTI
2. Yes, SUTI 1a
3. Yes, ABUTI

Case 7

- 08/25: 73 y.o. patient in neurosurgical ICU. admitted following cerebrovascular accident. Ventilated, subclavian catheter and Foley catheter in placed on admit. Patient reacts only to painful stimuli.
- 9/2: WBCs slightly elevated, at 12,000/mm^3, temp 37.4°C, urine cloudy. Lungs clear to auscultation.

Case 7

- 9/3: WBC 15,800/mm^3, Temperature: 37.6°C., Breath sounds slightly coarse, minimal clear sputum. Urine unchanged. Blood, endotracheal and urine specimens collected. No suprapubic or CVA pain noted.
- 9/4: Blood and endotracheal cultures no growth. Urine + 100,000 CFU/ml *E. faecium.*

Does this patient have a UTI? If so, what type?

1. Yes, ABUTI.
2. Yes, SUTI Criterion 1a.
3. Yes, SUTI Criterion 1b.
4. No UTI.

Does this patient have a UTI?

1. No. The patient's fever is due to pneumonia. Therefore patient is symptomless.
2. Yes. SUTI 1a. Fever is a non-specific symptom and may be due to more than one infection at a time.

Case 8

- 8/16: 4-year-old girl admitted following MVA. Taken to OR for open-reduction and internal fixation of a left upper and right lower extremity fractures. Admit to pediatric surgical care unit with Foley catheter draining yellow urine, and right femur to traction. IV in right antecubital vein.

Case 8

- 8/18: Afebrile, taking clear liquid diet and beginning oral pain medication. Using incentive spirometer. Foley draining yellow urine.
- 8/19: Tolerating solid diet. IV converted to saline lock. Foley draining yellow urine.
- 8/20: Foley removed at 0800. Patient voiding without problems. Patient has slight cough of clear phlegm.

Case 8

- 8/21: In the morning, patient requesting bedpan frequently, crying with urination. Temp. 37.9°C. Cough unchanged. Straight cath urine specimen collected. Urine cloudy; U/A + for leukocyte esterase; nitrites negative; 10 WBC by HPF of spun urine. Later that evening, Gram stain of urine shows many gram-negative rods. Empiric Bactrim is ordered.
- 8/23: Urine culture + 50,000 CFU/ml of *E. coli.*

Does this patient have a UTI?

1. No
2. Yes, SUTI 1b
3. Yes, SUTI 2a
4. Yes, SUTI 2b

Case 9

- 3/20: 45-year-old male patient admitted with stage 4 sacral decubitus ulcer. Medical history, paraplegia X 10 years status post motorcycle accident. Suprapubic tube present to dependent urine collection bag, draining yellow urine. Wound care consult placed. Wet to dry dressing changes begun. Green drainage from base of decubitus sent for culture. Afebrile.
- 3/21: Dressing changes continue. CT scan of sacrum suggestive of osteomyelitis. PICC line placed and empiric antibiotics begun.

Case 9

- 3/23: Dressing changes continue. Large amount of green, foul-smelling drainage present.
- 3/24: To OR for surgical debridement. Readmitted to floor post-op with suprapubic tube, PICC line. Afebrile.
- 3/25: Temp 37.6°C. Less drainage from decubitus. Wound care specialist states that granulation tissue beginning to form. Cloudy urine from suprapubic tube.

Case 9

- 3/26: Temp 38.2°C. Patient with shaking chills. Blood and urine specimens collected for cultures and U/A. U/A results reported as + for leukocyte esterase, nitrites and 10 WBC/mm^3 of unspun urine.
- 3/27: Urine culture + 75,000 CFU/ml of *K. pneumoniae.* Blood culture positive for *K. pneumoniae.*

Does this patient have a UTI? CLABSI?

1. No UTI. CLABSI with *K. pneumoniae*
2. Yes, SUTI 1b with secondary BSI
3. Yes, SUTI 2a and CLABSI with *K. pneumoniae*
4. Yes, SUTI 2b with secondary BSI

Does the patient have a CAUTI?

1. No CAUTI.
2. Yes, Patient has a CAUTI.

Case 10

- 08/12: 70 female admitted to acute care facility, for an abdominal hysterectomy (HYST). Foley placed in OR at 0800. To GYN unit post-op. Foley draining clear, yellow urine. IV in left forearm, site without redness and dressing dry.
- 08/13 – Patient stable, Foley in place.
- 08/14 – Patient stabile, Foley removed at 1030. Afebrile. Patient discharged to home at 1400.
- 08/15 – Patient presents to ED with Temp 38.8°C, suprapubic tenderness and dysuria. Blood and urine specimens sent, urinalysis sent. Patient admitted to Med/Surg unit.
- 08/17 Labs results Urine culture (+) 75,000 CFU/ml of MRSA and blood culture (+) for MSSA. U/A results reported as + for leukocyte esterase, nitrites and 10 WBC/mm^3 of unspun urine.
-

Does this patient have an HAI/HAIs?

1. No, this is present on admission
2. Yes, SUTI 2a with secondary BSI
3. Yes, SUTI 1a and a BSI
4. Yes, ABUTI

To what unit is it attributable?

1. GYN unit
2. Med/Surg unit

Case 11

- 9/1: 68 year old diabetic female transferred to IRF from acute care facility, status post knee arthroplasty (KPRO). Foley on admission draining pink urine. Bulb suction to both knees via stab wounds draining small amount bloody drainage. IV in left forearm, site without redness and dressing dry.
- 9/2: Foley removed. Patient up to bathroom with help of physical therapist. IV continues. Taking full liquids for lunch. Afebrile.

Case 11

- 9/3: Patient to physical therapy. Complains of burning with urination and urgency. Suprapubic pain upon palpation. Temp 37.8°C. Urine collected and sent for culture and U/A. + for >10 WBCs by HPF of unspun urine, + leukocyte esterase. Empiric antibiotics begun.
- 9/4: Urine culture >100,000 CFU/ml *S. epidermidis.*

Does this patient have a UTI attributable to acute care facility?

1. Yes. Patient has a SUTI 1a attributable to the acute care facility.
2. No. Patient's SUTI 1a is attributable to IRF.
3. No. Patient does not have a UTI.

Case 12

How many indwelling catheter days?

A. 6
B. 5
C. 4
D. 3
E. 2
F. 1

Catheter Day Count at 12 noon

Patient	ADT	Urinary Status
101 Black	Day2	Indwelling Foley to direct drainage (DD)
102 White	Day 3	Bedpan – cath spec to lab
103 Gray	D/C home 1.p.m	Voiding
104 Salmon	Adm 2 p.m.	Foley to DD
105 Green	Adm 9 a.m.	Suprapubic to DD
106 Berry	Day 5	Indwelling foley to DD
107 Brown	D/C to home @ 11 a.m.	Straight cath Q3 hours

How many indwelling catheter days?

A. 6
B. 5
C. 4
D. 3
E. 2
F. 1

Patient	ADT	Urinary Status
101 Black	Day2	Indwelling Foley to direct drainage (DD)
102 White	Day 3	Bedpan – cath spec to lab
103 Gray	D/C home 1.p.m	Voiding
104 Salmon	Adm 2 p.m.	Foley to DD
105 Green	Adm 9 a.m.	Suprapubic to DD
106 Berry	Day 5	Indwelling foley to DD
107 Brown	D/C to home @ 11 a.m.	Straight cath Q3 hours

Case 13

How many indwelling catheter days?

A. 6
B. 5
C. 4
D. 3
E. 2
F. 1

Catheter Day Count at 11 p.m.

Patient	ADT	Urinary Status
101 Washington	Adm. @ 4 p.m.	Condom cath to direct drainage (DD)
102 Dallas	Day 2	Indwelling Foley to DD
103 St. Charles	D/C @ 11 a.m.	Voiding
104 London	Day 3	Incontinent using diaper
105 Orlando	Day 2	Suprapubic to DD
106 Denver	D/C to home @ 4 .pm.	Indwelling Foley to DD
107 England	Adm @ 1 p.m.	Voiding

How many indwelling catheter days?

Patient	ADT	Urinary Status

A. 6
B. 5
C. 4
D. 3
E. 2
F. 1

Great Job!!!

Questions: email user support
nhsn@cdc.gov

NHSN Website:
http://www.cdc.gov/nhsn/

Please place tab here with the number and title 9. Advanced Analysis. Presentation should be double sided, black and white, and 2 slides per page.

Advanced NHSN Analysis: Focus on SSI Data

Maggie Dudeck, MPH, CPH
NHSN Training Course
Atlanta, GA
October 3, 2012

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Objectives

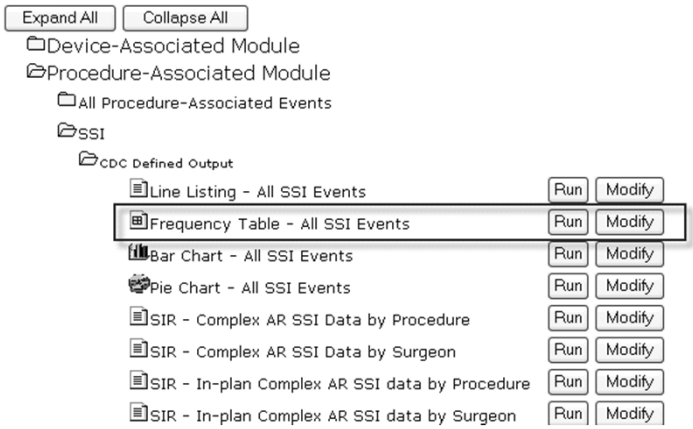
- Demonstrate the use of frequency tables for event-level data.
- Describe and interpret the SIR for surgical site infections using a real-world scenario.
- Outline the steps for investigating inaccuracies or unexpected results in the SSI SIR.

Example #1
SSI Frequency Table

- **You need to obtain a count of specific SSI events that were identified following COLO, HYST, HPRO, and KPRO procedures performed in 2011.**

(refer to pages 2 & 3 of your Results handout)

Example #1



Example #1
Modifications to Frequency Table

Select a time period or Leave Blank for Cumulative Time Period:

Date Variable	Beginning	Ending	
procDateYr	2011	2011	Clear Time Period

☐ Enter Date variable/Time period at the time you click the Run button

- **For this example, we're limiting the time period based on procedure date (procDateYr), as opposed to event date.**
- **WHY? We're interested in SSIs attributed to procedures performed during this time period – <u>not</u> SSIs identified during this time period.**

Example #1
Modifications to Frequency Table

Other Options:

Selected Variables to include in output:

Row:	Column:	Page by:
procCode	spcEvent	

Frequency Table Options:

- ☑ Table percent - Display cell frequency divided by table total
- ☐ Missing - Include observations with missing values
- ☐ Print the table in list form

Two-Way Table Options:

- ☑ Row Percent - Display cell frequency divided by row total
- ☑ Column Percent - Display cell frequency divided by column total
- ☐ Expected - Expected cell frequencies
- ☐ Chi-square - Test for independence

- **Any variable in the dataset can be used in the frequency table.**

Example #1
RESULTS

Frequency
Percent
Row Pct
Col Pct

Table of procCode by spcEvent

procCode(Procedure Code)	spcEvent(Specific Event)							
	BONE	DIP	GIT	IAB	JNT	OREP	SIP	Total
COLO	0	18	4	11	0	0	16	49
	0.00	21.95	4.88	13.41	0.00	0.00	19.51	59.76
	0.00	36.73	8.16	22.45	0.00	0.00	32.65	
	0.00	54.55	100.00	91.67	0.00	0.00	64.00	
HPRO	2	6	0	0	3	0	5	16
	2.44	7.32	0.00	0.00	3.66	0.00	6.10	19.51
	12.50	37.50	0.00	0.00	18.75	0.00	31.25	
	100.00	18.18	0.00	0.00	60.00	0.00	20.00	
HYST	0	6	0	1	0	1	2	10
	0.00	7.32	0.00	1.22	0.00	1.22	2.44	12.20
	0.00	60.00	0.00	10.00	0.00	10.00	20.00	
	0.00	18.18	0.00	8.33	0.00	100.00	8.00	
KPRO	0	3	0	0	2	0	2	7
	0.00	3.66	0.00	0.00	2.44	0.00	2.44	8.54
	0.00	42.86	0.00	0.00	28.57	0.00	28.57	
	0.00	9.09	0.00	0.00	40.00	0.00	8.00	
Total	2	33	4	12	5	1	25	82
	2.44	40.24	4.88	14.63	6.10	1.22	30.49	100.00

- **Let's focus on one specific "group" as we interpret these various statistics…**

Example #1
RESULTS

Frequency
Percent
Row Pct
Col Pct

	DIP	TOTAL
COLO	18	49
	21.95	59.76
	36.73	
	54.55	
TOTAL	33	82
	40.24	100.00

- **Frequency = count of records within each strata**
  - **82** total SSIs attributed to these procedures performed in 2011
  - **49** total SSIs following COLO procedures
  - **33** total SSIs were DIP
  - **18** SSIs were DIP following COLO procedures

Example #1
RESULTS

Frequency
Percent
Row Pct
Col Pct

	DIP	TOTAL
COLO	18	49
	21.95	59.76
	36.73	
	54.55	
TOTAL	33	82
	40.24	100.00

- **Percent = percent of the total included in the table**
  - **59.76%** of all SSIs in this example were attributed to COLO procedures
  - **40.24%** of all SSIs in this example were identified as DIP
  - **21.95%** of all SSIs in this example were identified as DIP following COLO procedures

Example #1
RESULTS

Frequency
Percent
Row Pct
Col Pct

	DIP	TOTAL
COLO	18	49
	21.95	59.76
	36.73	
	54.55	
TOTAL	33	82
	40.24	100.00

- **Row pct = percent of the total within that row**
  - **36.73%** of all SSIs attributed to COLOs were identifed as DIP

Example #1
RESULTS

Frequency
Percent
Row Pct
Col Pct

	DIP	TOTAL
COLO	18	49
	21.95	59.76
	36.73	
	54.55	
TOTAL	33	82
	40.24	100.00

- **Col pct = percent of the total within that column**
  - **54.55%** of all SSIs identified as DIP were attributed to COLO procedures

Question 1

Frequency
Percent
Row Pct
Col Pct

	SIP	TOTAL
HPRO	5	16
	6.10	19.51
	31.25	
	20.00	
TOTAL	25	82
	30.49	100.00

What percentage of HPRO SSIs were identified as SIP?

1. **20%**
2. **6.1%**
3. **31.25%**
4. **19.51%**

Question 2

Frequency
Percent
Row Pct
Col Pct

	SIP	TOTAL
HPRO	5	16
	6.10	19.51
	31.25	
	20.00	
TOTAL	25	82
	30.49	100.00

What percentage of all SSIs were identified as SIP?

1. **19.51%**
2. **30.49%**
3. **20%**
4. **6.10%**

Question 3

Frequency
Percent
Row Pct
Col Pct

	SIP	TOTAL
HPRO	5	16
	6.10	19.51
	31.25	
	20.00	
TOTAL	25	82
	30.49	100.00

What percentage of all SSIs were identified as SIP following HPRO procedures?

1. **30.49%**
2. **19.51%**
3. **20%**
4. **6.10%**

Example #2
SSI SIR

- **You have been following 4 select procedures in your facility for SSIs and reporting these data to NHSN:**
  - COLO
  - HYST
  - HPRO
  - KPRO
- **You have been asked to report a measurement of your facility's SSI experience for these procedures for the first half of 2011 at your next committee meeting.**
- **You decide to use the SIR…**

Why not use a rate?

- **Previously, SSIs were measured using rates that were calculated from the Basic Risk Index**
- **Limitations to using the Basic Risk Index:**
  - Risk index relies on three risk factors only
  - These same risk factors must differentiate risk for all types of procedures
  - The relative contribution of these factors are constrained to be equal

Why not use a rate?

- **SSI Rates have been replaced by SSI SIRs**
  - SSI Rates output options have been moved to "Advanced" folder
  - You can still obtain your facility's SSI rates using Basic Risk Index, however NHSN pooled mean and comparison statistics for SSI Rates will no longer be available
  - SIRs use several risk factors to build logistic regression models for improved risk adjustment

Standardized Infection Ratio

$$\text{SIR} = \frac{\text{Observed \# of HAIs}}{\text{Expected (Predicted) \# of HAIs}}$$

- **Observed # of HAI – the number of events that you enter into NHSN**
- **Expected or predicted # of HAI – comes from national baseline data**
- **An SIR of 1.21 would be interpreted as: 21% more infections than expected.**

How do our data look in NHSN?

- **NHSN will calculate SIRs for you**
- **There are multiple SSI SIR options – each containing slightly different results!**
  - TODAY we will use the **All SSI SIR** report
  - There are other options – we'll discuss these later.

All SSI SIR for Select Procedures – 2011H1 Overall

National Healthcare Safety Network
SSI SIR for Select Procedures 2011H1 - By OrgID
As of: May 2, 2012 at 2:05 PM
Date Range: SIR_ALLSSIPROC summaryYH 2011H1 to 2011H1
if (((procCode IN ("COLO", "HPRO", "HYST", "KPRO"))))

Org ID=10018

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.
Excludes Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs.
Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.
Source of aggregate data: 2006-2008 NHSN SSI Data
Data contained in this report were last generated on May 2, 2012 at 7:17 AM.

Question 4

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

Based on the p-value <u>and</u> the 95% CI, is the number of observed infections statistically significantly different from the number expected?

1. **Yes**
2. **No**
3. **Not sure**

Overall SIR Interpretation

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

- **During the first half of 2011, our facility observed 34 SSIs, attributed to 1088 COLO, HYST, HPRO, and KPRO procedures performed .**
- **The number of expected SSIs during this timeframe, based on national data, was 28.059.**
- **This yields an SIR of 1.212, indicating that we observed approx. 21% more infections than expected**
- **Based on statistical evidence, we can conclude that our SIR is no different than 1.**

All SSI SIR – 2011H1
By Procedure

Org ID	Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
10018	HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
10018	HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
10018	KPRO	2011H1	370	4	4.780	0.837	0.4799	0.228, 2.143

- **SIRs are provided for each procedure category and time period.**
  - Includes p-value and 95% CI for each category
  - Allows you to see each procedure category's contribution to the overall SIR, including the number of expected infections.
  - Can view changes in SIR for each procedure category over time

Wait a minute…you keep mentioning the term "expected"…how do we know how many SSIs are "expected"?

Expected SSIs

- **The number of expected SSIs is calculated by summing the procedure risk for all procedures included in the summarized calculation (e.g., all procedures for 2011, H1)**
- **The procedure risk is calculated from improved risk models***
  - The "Basic Risk Index" is no longer used for national SSI analyses
  - New risk models provide improved risk adjustment in the prediction of SSIs

*Mu Y et al. Infect Control Hosp Epidemiol 2011;32(10):970-986.

Question 5

The table below includes significant risk factors for a selection of patients undergoing a specific NHSN procedure category.

Patient	Age	General Anesthesia?	ASA	Procedure Duration (mins)	Endoscopic Approach?	Medical School Affiliated	Number of Beds	Wound Class	Probability of SSI
1	88	Y	1	194	N	Y	566	CO	0.0643
2	87	Y	1	82	N	Y	566	CO	0.0482
3	42	Y	2	282	N	Y	566	CC	0.0807
4	25	Y	1	161	N	Y	566	CC	0.0613

Using the information in the above table, which patient do you think is at highest risk of SSI?

1. **Patient #1**
2. **Patient #2**
3. **Patient #3**
4. **Patient #4**

Available NHSN Risk Factors

For All Procedures	General anesthesia	Age
Wound class	Emergency	Gender
ASA score	Trauma	Endoscope
Duration of procedure	Bed size[Δ]	Med School Affiliation[Δ]

For C-section	Duration of labor
Weight Height	Estimated blood loss

For Spinal fusion	Diabetes Mellitus
Spinal level	Approach/Technique

For Hip/Knee prosthesis
Total/Partial Primary/Revision

[Δ]Hospital-level factor

Logistic Regression Model
SSI after VHYS (N=19,056)*

Factor	Parameter Estimate	OR	p-value
Intercept	***-5.89***	-	-
Age (≤44 vs >44)	**0.66**	**1.94**	**<0.0001**
ASA (>2 vs ≤2)	**0.42**	**1.51**	**0.0363**
Duration (>100 vs ≤100)	**0.50**	**1.65**	**0.0011**
Med school affiliation (Y vs N)	**0.89**	**2.42**	**<0.0001**

* Mu Y et al. Infect Control Hosp Epidemiol 2011;32(10):970-986.

Logistic Model for VHYS:

Factor	Parameter Estimate
Intercept	*-5.89*
Age (≤44)	0.66
ASA (3/4/5)	0.42
Duration (>100 min)	0.50
Med school affiliation (Y)	0.89

$$\text{logit}(\hat{p}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

$$= -5.89 + 0.66\,(\text{Age} \leq 44^*) + 0.42\,(\text{ASA} > 2^*) + 0.50\,(\text{Duration} > 100^*) + 0.89\,(\text{Med school affiliation}^*)$$

*For these risk factors, if present = 1; if not = 0

Example VHYS Patient #1 Risk Factors

- Age = 40
- ASA score = 4
- Duration = 117 min
- Med school affiliation = Y

Logistic Model
Calculation for Example VHYS Patient #1

$$\text{logit}(\hat{p}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

$$\text{logit}(\hat{p}) = -5.89 + 0.66\,(1) + 0.42\,(1) + 0.50\,(1) + 0.89\,(1) = \underline{-3.42}$$

Solve for $\hat{p}$: $\hat{p} = e^{\text{logit}(\hat{p})} / (1 + e^{\text{logit}(\hat{p})})$

$\hat{p} = e^{-3.42} / (1 + e^{-3.42}) =$ **0.032** or 3.2% risk

List of Patient Risk Factors
SSI after VHYS

Patient	Age	Duration	ASA Score	Med School Affiliation	SSI	Prob of SSI ($\hat{p}$)
1	40	117	4	Y	0	**0.032**
2	53	95	2	N	0	**0.003**
3	30	107	2	Y	1	**0.019**
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
100	37	128	4	Y	1	**0.032**
		Total			**O = 3**	**E = 2.91**

Standardized Infection Ratio (SIR) = 3 / 2.91 = 1.0

Procedure Risk – COLO*

Risk Factor	Parameter Estimate
Intercept	*-3.89*
Age10	-0.02
Anesthesia (Y)	0.38
ASA (>2)	0.30
Duration10	0.03
Endoscope (N)	0.13
Med School affiliation (N)	0.14
Bedsize (>500)	0.26
Wound class (CO/D)	0.09

National Healthcare Safety Network
Line Listing - COLOs 2011H1 with Risk
As of: May 2, 2012 at 10:25 AM
Date Range: PROCEDURES procDateYH 2011H1 to 2011H1

Procedure ID	Procedure Date	Age on Proc Date	General Anesthesia?	ASA Class	Duration of Procedure - hr	Duration of Procedure - min	Endoscopic Approach?	Medical School Affiliated	Number of Beds	Wound Class	Risk using All SSI Model
232407	04/20/2011	88	Y	1	3	14	N	Y	566	CO	0.0643
232408	04/21/2011	87	Y	2	4	10	N	Y	566	CO	0.0742
232409	04/22/2011	87	Y	1	1	22	N	Y	566	CO	0.0482
232410	04/27/2011	87	Y	5	2	2	N	Y	566	CC	0.0653
232411	05/03/2011	86	Y	1	2	42	N	Y	566	CC	0.0545
232412	05/05/2011	84	Y	3	3	20	N	Y	566	CC	0.0800
232413	05/12/2011	84	Y	3	1	40	N	Y	566	CC	0.0621

* Mu Y et al. Infect Control Hosp Epidemiol 2011;32(10):970-986.

Translation from Procedure-specific SIRs to Overall SIR

Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
KPRO	2011H1	370	4	4.78	0.837	0.4799	0.228, 2.143

The "number expected" is calculated by summing the estimated risk for each procedure in that category and time period.

Translation from Procedure-specific SIRs to Overall SIR

Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
KPRO	2011H1	370	4	4.78	0.837	0.4799	0.228, 2.143
TOTAL	**2011H1**	**1088**	**34**	**28.059**	**1.212**	-----	-----

The infection count, procedure count, and number of expected infections are summed.

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

Translation from Procedure-specific SIRs to Overall SIR

Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
KPRO	2011H1	370	4	4.78	0.837	0.4799	0.228, 2.143
TOTAL	**2011H1**	**1088**	**34**	**28.059**	**1.212**	-----	-----

The overall SIR is <u>not</u> a sum of the individual SIRs, but rather is calculated by:
Total infection count/ total expected count

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

Question 6

Org ID	Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
10018	HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
10018	HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
10018	KPRO	2011H1	370	4	4.780	0.837	0.4799	0.228, 2.143

Based on the table above, which procedure category has the highest contribution to the overall SIR?

1. HPRO
2. COLO
3. KPRO
4. HYST

SSI SIR Options in NHSN

All SSI SIR Model	• Includes Superficial, Deep & Organ/Space • Superficial & Deep incisional SSIs limited to primary only • Includes SSIs identified on admission, readmission & via post-discharge surveillance
Complex A/R SSI Model	• Includes <u>only</u> SSIs identified on Admission/Readmission to facility where procedure was performed • Includes <u>only</u> inpatient procedures • Includes <u>only</u> Deep incisional primary & Organ/Space SSIs
Complex 30-day SSI model (used for CMS IPPS)	• Includes only in-plan, inpatient COLO and HYST procedures in adult patients (i.e., ≥ 18 years of age) • Includes only deep incisional primary and organ/space SSIs with an event date within 30 days of the procedure • Uses only age and ASA to determine risk

SSI SIR Models

TABLE 5. Models to Predict All Surgical Site Infections (SSIs) at Primary Incision Site for 39 Procedures, National Healthcare Safety Network (NHSN), 2006–2008

Procedure code	No. of procedures	No. of SSIs	Effect	Estimate	OR (95% CI)	P	c-index PSM	c-index RIM	c-index Pr>|t|
APPY	6,122	85					.70	.60	.0037
			Intercept	−5.54		<.0001			
			Emergency, Y vs N	0.61	1.84 (1.14–2.99)	.0135			
			Gender, M vs F	0.53	1.70 (1.07–2.68)	.024			
			Bed size, >500 vs ≤500	0.77	2.15 (1.38–3.34)	.0007			
			Wound class, CO vs C/CC	0.63	1.89 (1.07–3.33)	.0294			
			Wound class, D vs C/CC	1.26	3.53 (2.04–6.09)	<.0001			

TABLE 6. Multivariate Models Predicting Deep Incisional and Organ/space Surgical Site Infections (SSIs) Detected During Initial Hospitalization or Rehospitalization at the Same Hospital for 39 Procedures Reported to the National Healthcare Safety Network, 2006–2008

Procedure code	No. of procedures	No. of SSIs	Effect	Estimate	OR (95% CI)	P	c-index
APPY	5,889	50					.74
			Intercept	−6.62		<.0001	
			Emergency, Y vs N	0.87	2.38 (1.21–4.67)	.0116	
			Gender, M vs F	0.84	2.31 (1.22–4.38)	.0099	
			Bed size, >500 vs ≤500	0.94	2.56 (1.44–4.54)	.0013	
			Wound class, CO/D vs C/CC	1.07	2.90 (1.64–5.15)	.0003	

Mu Y et al. Infect Control Hosp Epidemiol 2011;32(10):970-986.

SSI SIR Models – at the Procedure level

National Healthcare Safety Network
Line Listing for All Procedures
As of: June 29, 2012 at 8:40 AM
Date Range: PROCEDURES procDateYr 2011 to 2011

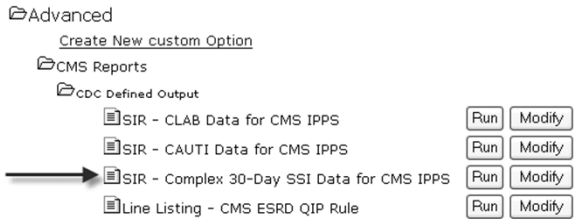
patID	ageAtProc	procID	procDate	procCode	asa	procDurationHr	procDurationMin	swClass	modelRiskAll	modelRiskComplex	modelRiskComplex30d
3459756	54	232683	01/03/2011	COLO	5	1	46	CC	0.0668	0.0287	0.0401
3459851	42	232778	01/03/2011	COLO	2	4	4	CC	0.0733	0.0318	0.0299
3459654	74	232581	01/04/2011	COLO	3	2	13	CC	0.0688	0.0312	0.0325
3459757	53	232684	01/05/2011	COLO	2	3	16	CC	0.0635	0.0274	0.0268
3459952	75	232879	01/05/2011	COLO	2	2	15	CC	0.0520	0.0227	0.021
3459549	46	232476	01/06/2011	COLO	2	3	22	CC	0.0654	0.0279	0.0287

Example #3
Investigating SSI data for CMS IPPS

- **In preparation for Q2 data submission for CMS, you decide to check a specialized report in NHSN to ensure that the data that will be submitted to CMS are complete and accurate.**
  - You have already confirmed that your monthly reporting plans include inpatient COLO and HYST procedures for SSI.
  - You have already confirmed that all procedures have been reported to NHSN for the full quarter.

Example #3
Investigating SSI data for CMS IPPS

- **Step 1: Run the "SIR – Complex 30-day SSI data for CMS IPPS" output option.**



This report will mirror the data that will be submitted to CMS on behalf of your facility.

Example #3
Step 1

National Healthcare Safety Network
SIR for Complex 30-Day SSI Data for CMS IPPS by Procedure - By OrgID/ProcCode
As of: September 6, 2012 at 11:18 AM
Date Range: All SIR_COMPLEX30DSSIPROC

orgid=10018

orgid	proccode	summaryYQ	procCount	infCountComplex30d	numExpComplex30d	SIRComplex30d	SIRComplex30d_pval	SIRComplex30d95CI
10018	COLO	2012Q1	0	0	0	.	.	
10018	COLO	2012Q2	164	1	4.356	0.23	0.069	0.006, 1.279
10018	HYST	2012Q1	0	0	0	.	.	
10018	HYST	2012Q2	50	1	0.321	.	.	

- **Focusing on the 2nd quarter's data (2012Q2), you're concerned that the number of procedures and SSIs represented in this table are inaccurate.**

Example #3
Step 2

- **The number of HYST procedures in the SIR appears to be too low (50) and you're concerned that at least one month of data is missing from the SIR.**
- **SOLUTION: Check the Alerts!**

Incomplete/Missing List

Incomplete Events | Missing Events | Incomplete Summary Data | Missing Summary Data | Incomplete Procedures | Missing Procedures | Missing Procedure-associated Events

Print this report
Display All

First | Previous | Next | Last — Displaying 1 - 1 of 1

Month/Year	Procedures	SSI	Report No Events	Post-procedure PNEU	Report No Events
06/2012	HYST - Abdominal hysterectomy	IN - Inpatient	☐		☐

First | Previous | Next | Last — Displaying 1 - 1 of 1

Save | Reset

Example #3
Step 2

- **REMEMBER: Beginning with 2012 data, when an SSI has not been reported, you must check the 'Report No Events' box in order for that procedure and month to be included in the SIRs!!!**

Incomplete/Missing List

Incomplete Events | Missing Events | Incomplete Summary Data | Missing Summary Data | Incomplete Procedures | Missing Procedures | Missing Procedure-associated Events

Print this report
Display All

First | Previous | Next | Last — Displaying 1 - 1 of 1

Month/Year	Procedures	SSI	Report No Events	Post-procedure PNEU	Report No Events
06/2012	HYST - Abdominal hysterectomy	IN - Inpatient	☐		☐

First | Previous | Next | Last — Displaying 1 - 1 of 1

Save | Reset

Example #3
Step 3

- **You know that your facility identified a total of 4 SSIs for the quarter (2 COLO and 2 HYST), yet only 2 of those SSIs are appearing in the SIR.**
- **SOLUTION: Run the SSI Line List to determine why events were excluded.**

Example #3
Step 3

REMEMBER!
CMS-related SSI data will only include deep incisional primary and organ/space SSIs with an event date that is within 30 days of the procedure!

National Healthcare Safety Network
Line Listing for All Surgical Site Infection Events
As of: August 28, 2012 at 1:48 PM
Date Range: SSI_EVENTS procDateYQ 2012Q2 to 2012Q2

Specific Event=DIP

Patient ID	Date of Birth	Gender	Event ID	Event Date	Event Type	Specific Event	Procedure Date	Procedure Code	Duration of Procedure - hr	Duration of Procedure - min	ASA Class	Days: Procedure to Event
312242	10/14/1935	F	35331	07/17/2012	SSI	DIP	06/14/2012	COLO	1	24	1	34
345297	01/31/1937	M	35332	06/10/2012	SSI	DIP	05/25/2012	COLO	2	10	1	17
540527	09/30/1948	F	35333	06/06/2012	SSI	DIP	05/26/2012	HYST	2	1	1	12

Data contained in this report were last generated on August 28, 2012 at 12:12 PM.

National Healthcare Safety Network
Line Listing for All Surgical Site Infection Events
As of: August 28, 2012 at 1:48 PM
Date Range: SSI_EVENTS procDateYQ 2012Q2 to 2012Q2

Specific Event=SIP

Patient ID	Date of Birth	Gender	Event ID	Event Date	Event Type	Specific Event	Procedure Date	Procedure Code	Duration of Procedure - hr	Duration of Procedure - min	ASA Class	Days: Procedure to Event
323769	10/21/1940	F	35330	05/31/2012	SSI	SIP	05/11/2012	HYST	1	54	1	21

Example #3
Step 4

- **While the SIR indicates that 164 COLOs were reported, you're sure that you imported 166 COLOs for the quarter and you're concerned with this discrepancy.**
- **SOLUTION:**
  A. FIRST – check the SIR again to see if any procedures have been excluded due to SIR exclusion criteria
  B. SECOND – check a line list or frequency table to see how many procedures are outside the scope of the CMS reporting requirements (and therefore, excluded from the SIR)

Example #3
Step 4-A

National Healthcare Safety Network
Incomplete Procedures not Included in SIR
As of: September 6, 2012 at 11:13 AM
Date Range: All SIR_COMPLEX30DSSIPROC

orgID=10018

summaryYQ	orgID	procCode	procCount	infCountComplex30d
2012Q2	10018	HYST	1	0

- **This table represents the number of applicable procedures that are excluded from the SIR for one or more reasons (e.g., extreme procedure duration).**
- **The exclusion criteria are listed in Appendix C of the SIR Newsletter.**

Example #3
Step 4-B

- **By running a procedure line list and including the variable modelRiskComplex30d, you can see which procedures are excluded from the Complex 30-day SIR at a glance.**
  - TIP: Those records where the risk is not calculated (indicated by a .) will be excluded from the SIR; the risk is only calculated for applicable procedures that do not meet any of the exclusion criteria.

Example #3
Step 4-B

National Healthcare Safety Network
Line Listing for All Procedures
As of: September 6, 2012 at 11:16 AM
Date Range: PROCEDURES procDateYQ 2012Q2 to 2012Q2

Procedure Code=COLO

Procedure ID	Age on Proc Date	Gender	Procedure Date	Procedure Code	ASA Class	Outpatient?	Risk using Complex 30 day Model
35097	87	M	04/20/2012	COLO	1	Y	.
35228	12	F	04/17/2012	COLO	1	N	.
35077	89	F	06/21/2012	COLO	1	N	0.0181
35222	89	F	04/07/2012	COLO	1	N	0.0181
35083	88	F	04/15/2012	COLO	2	N	0.0183
35186	88	F	06/22/2012	COLO	2	N	0.0183
35264	88	F	06/25/2012	COLO	1	N	0.0183
35287	87	M	06/28/2012	COLO	1	N	0.0185
35128	85	F	04/28/2012	COLO	2	N	0.0189

- **The records outlined above are not considered applicable procedures; one COLO is an outpatient, the other was performed on a patient <18 years old.**

- **TIP: <u>Always</u> check the footnotes!**

National Healthcare Safety Network
SIR for Complex 30-Day SSI Data for CMS IPPS by Procedure - By OrgID/ProcCode
As of: September 6, 2012 at 11:18 AM
Date Range: All SIR_COMPLEX30DSSIPROC

orgid=10018

orgid	proccode	summaryYQ	procCount	infCountComplex30d	numExpComplex30d	SIRComplex30d	SIRComplex30d_pval	SIRComplex30d95CI
10018	COLO	2012Q1	0	0	0	.	.	
10018	COLO	2012Q2	164	1	4.356	0.23	0.069	0.006, 1.279
10018	HYST	2012Q1	0	0	0	.	.	
10018	HYST	2012Q2	89	1	0.555	.	.	

Includes in-plan, inpatient COLO and HYST procedures in patients >=18 years of age.
Includes SSIs with an event date within 30 days of the procedure date.
Excludes all Superficial Incisional SSIs and Deep Incisional Secondary (DIS) SSIs.
Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.
Source of aggregate data: 2006-2008 NHSN SSI Data
Data contained in this report were last generated on September 6, 2012 at 11:10 AM.

SSI SIR
Details, details

- **There are more details about the SSI SIRs…**
  - Some procedures will be excluded based on certain criteria
  - Sometimes, the SIR may not be calculated
- **For more information, please see the SIR Newsletter!!!!**

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf

ADVANCED USE OF CUSTOM OUTPUT

Output Sets

- There may be reports that you wish to run simultaneously on a regular basis (e.g., CLABSI line list and CLABSI rate table, or all SIRs applicable to CMS IPPS reporting)
- You can create custom output sets in NHSN that will allow you to run multiple reports with a single click of the "Run" button

Output Sets

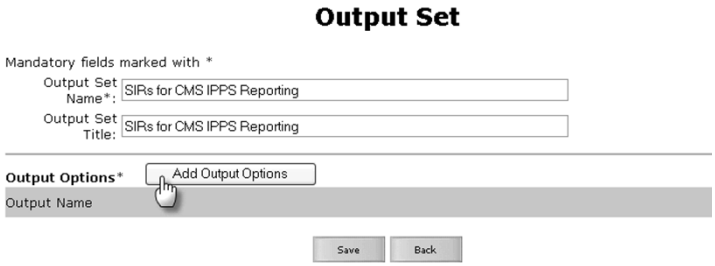
- For example, if your facility participates in the CMS IPPS program and you report all applicable CLABSI, CAUTI, and SSI data to NHSN, you may wish to have one output option that includes all SIRs that would be submitted to CMS on your behalf.

Output Sets

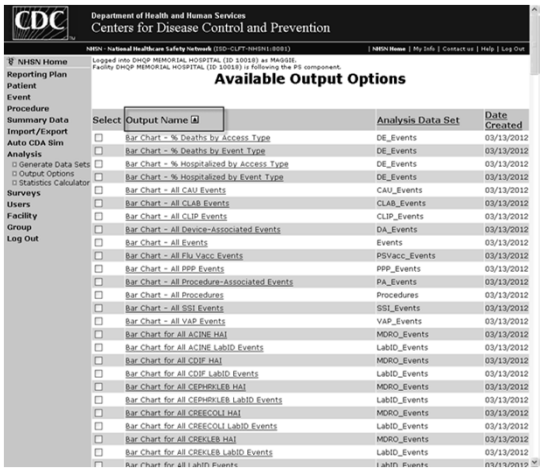
- **To create an output set, go to the My Custom Output folder on the output options screen, expand the folder for Output Sets and click "Create New Output Set".**

Output Sets

- **On the Output Set screen, enter a name and title for this output set.**
- **Then, click "Add Output Options".**



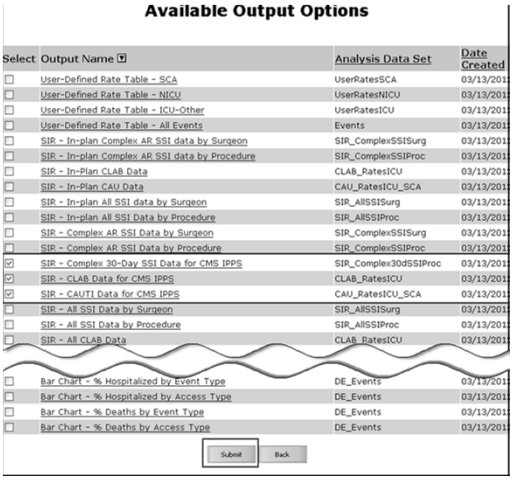
Output Sets



- **The list of Available Output Options will appear.**
- **This list includes every CDC-defined and custom output option.**
- **The list can be sorted by clicking on any column title.**

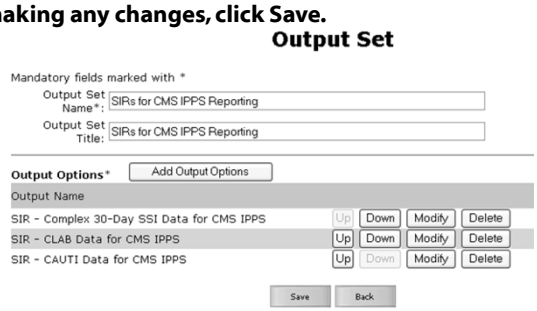
Output Sets

- **For our example, the following output options were selected by checking the boxes in the first column:**
  - SIR – Complex 30-Day SSI Data for CMS IPPS
  - SIR – CLAB Data for CMS IPPS
  - SIR – CAUTI Data for CMS IPPS
- **Once all options have been selected, click "Submit" at the bottom of the screen.**

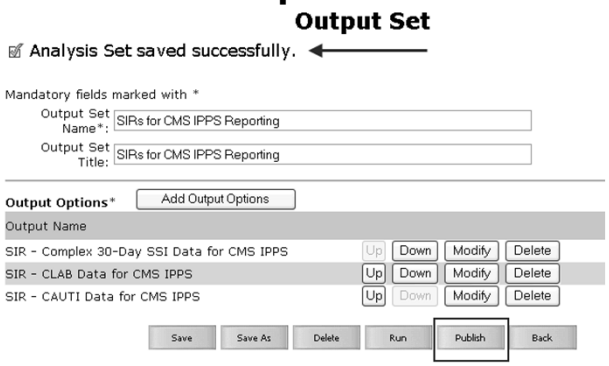


Output Sets

- **Once the desired output options have been selected, you will be brought back to the Output Set screen.**
- **On this screen, you can:**
  - Change the order that these data will appear by clicking the Up and Down buttons
  - Further modify the output options by clicking Modify
  - Remove an output option from the set by clicking Delete
- **After making any changes, click Save.**

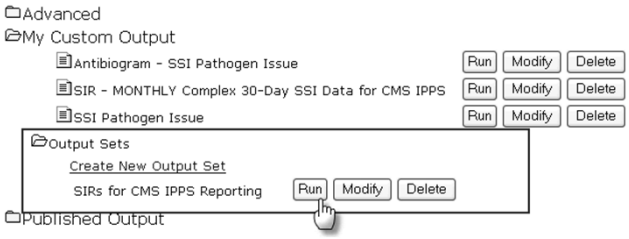


Output Sets



- **After saving the Output Set, you should receive a message at the top of the screen indicating that the save was successful.**
- **Notice that you can make additional changes and even Publish this output set for other users at your facility.**

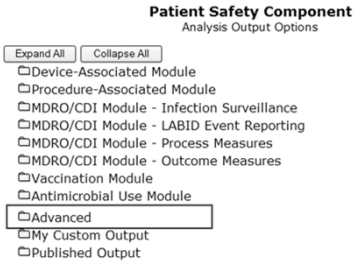
Output Sets



- **Once saved, your output set will be available within the My Custom Output folder, under Output Sets.**
- **By clicking "Run", all output options within that set will appear in the same results window.**

Advanced Output Options

- **In addition to module-specific analyses, NHSN provides datasets that allow for more in-depth analyses through an "Advanced" folder on the Output Options tree view.**
- **Advanced output options can be modified in the same manner as the module-specific options.**



Advanced Output Options

- **The following slides will highlight some of the most frequently-used advanced output options.**

Patient Safety Component
Analysis Output Options

Expand All | Collapse All

- Device-Associated Module
- Procedure-Associated Module
- MDRO/CDI Module - Infection Surveillance
- MDRO/CDI Module - LABID Event Reporting
- MDRO/CDI Module - Process Measures
- MDRO/CDI Module - Outcome Measures
- Vaccination Module
- Antimicrobial Use Module
- Advanced
- My Custom Output
- Published Output

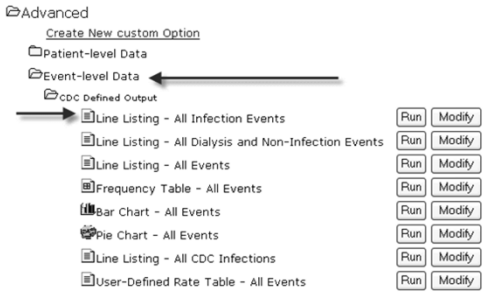
Advanced Output Options Procedure Line List

- **Use the procedure line list to obtain detailed information, including custom field data, for all procedures performed – not just those procedures resulting in an SSI.**
- **Navigate to: Advanced – Procedure-level Data**

Advanced
Create New custom Option
- Patient-level Data
- Event-level Data
- Procedure-level Data
  - CDC Defined Output
    - Line Listing - All Procedures (Run | Modify)
    - Frequency Table - All Procedures (Run | Modify)
    - Bar Chart - All Procedures (Run | Modify)
    - Pie Chart - All Procedures (Run | Modify)
    - Rate Table - SSI Data by Procedure and Risk Index (Run | Modify)
    - Run Chart - SSI Data by Procedure and Risk Index (Run | Modify)
    - Rate Table - Specific Event SSI Rates by Procedure (Run | Modify)
    - Run Chart - Specific Event SSI Data by Procedure (Run | Modify)
    - Rate Table - SSI Data by Surgeon, Procedure, and...more (Run | Modify)
    - Run Chart - SSI Data by Surgeon, Procedure, and ...more (Run | Modify)

Advanced Output Options
Event Line List with Pathogen(s)

- **If you're interested in seeing the pathogen(s) associated with each of your HAI events, use the "Line Listing – All Infection Events" line list.**
- **Navigate to: Advanced – Event-level Data**

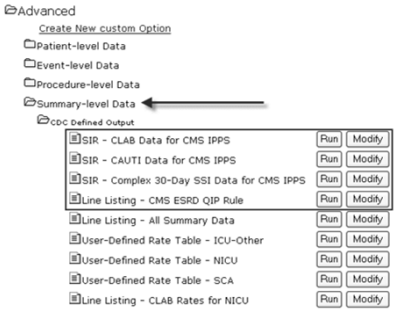


Advanced Output Options
Event Line List with Pathogen(s)

- **NOTE: Because this dataset will include all HAI events, you may want to limit the output to certain event types, time period, and/or location(s).**

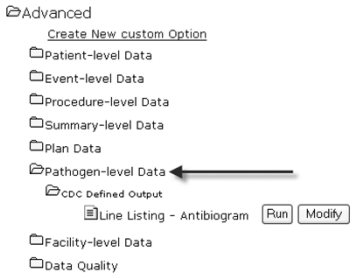
Advanced Output Options
CMS-related Reports

- If your facility reports data as part of a CMS measure, you can see your facility's data in NHSN as they would be submitted to CMS.
- Navigate to: Advanced – Summary-level Data



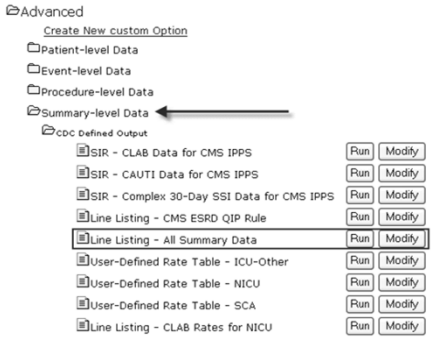
Advanced Output Options
Antibiogram

- The antibiogram is presented as a line list that will include the drugs and results for each organism for each reported infection event.
- Navigate to: Advanced – Pathogen-level Data
- NOTE: There will be one row per organism/event reported, up to three rows for a single event ID.



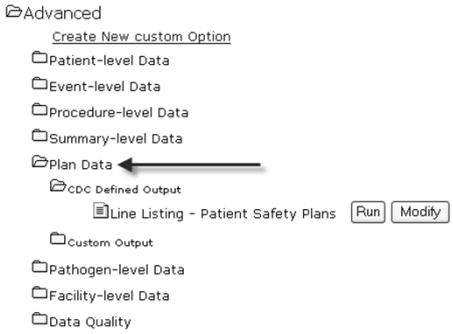
Advanced Output Options
Summary Data Line List

- The summary data line list provides denominator data (e.g., patient days, admissions, device days) for each location and month in a list format.
- Navigate to: Advanced – Summary-level Data



Advanced Output Options
Monthly Reporting Plan Line List

- The monthly reporting plan ("Patient Safety Plans") line list is helpful to groups who wish to review which data are included in a facility's monthly reporting plans, as well as which months had 0 in-plan procedures or 0 in-plan SSIs reported.
- Navigate to: Advanced – Plan Data



Additional Resources

- **Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network**
  - Infect Control Hosp Epidemiol 2011;32(10):970-986
  - http://www.cdc.gov/nhsn/PDFs/pscManual/SSI_ModelPaper.pdf
- **SIR Newsletter:**

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf

Additional Resources

- **Introduction to NHSN Analysis in the Patient Safety Component:**

  http://www.cdc.gov/nhsn/PDFs/training/intro-AnalysisBasics-PSC.pdf
- **Advanced NHSN Analysis in the Patient Safety Component**

  http://www.cdc.gov/nhsn/PDFs/training/AnalysisAdvanced_PSC.pdf
- **Details for CMS reporting and CMS-related reports within NHSN: http://www.cdc.gov/nhsn/library.html#cms**
- **NHSN Annual Reports: http://www.cdc.gov/nhsn/dataStat.html**

Advanced Analysis: Focus on SSI Data

Analysis Modifications and Results

NHSN Training Course

October 3, 2012

Example #1: SSI Frequency Table
Modifications to output option

Frequency Table

Analysis Data Set: SSI_Events [Export Analysis Data Set]

Modify Attributes of the Output:

Last Modified On: **05/31/2012**

Output Type: **Frequency Table**

Output Name: Frequency Table - All SSI Events

Output Title: Frequency Table for All Surgical Site Infection Events

Select output format:

Output Format: HTML

☐ Use Variable Labels

Notice that, in this example, we are limiting this frequency table based on the **procedure date,** since we are interested in SSIs attibuted to procedures that were performed during this time period.

Select a time period or Leave Blank for Cumulative Time Period:

Date Variable	Beginning	Ending
procDateYr	2011	2011

[Clear Time Period]

☐ Enter Date variable/Time period at the time you click the Run button

Specify Other Selection Criteria:

Show Criteria Column + Row + Clear Criteria

procCode				
IN (COLO, HYST, HPRO, KPRO)				

Other Options: Print Variable Reference List

Selected Variables to include in output:

Row:	Column:	Page by:
procCode	spcEvent	

Frequency Table Options:

☑ Table percent - Display cell frequency divided by table total
☐ Missing - Include observations with missing values
☐ Print the table in list form

Two-Way Table Options:

☑ Row Percent - Display cell frequency divided by row total
☑ Column Percent - Display cell frequency divided by column total
☐ Expected - Expected cell frequencies
☐ Chi-square - Test for independence

[Run] [Save As] [Reset] [Back] [Export Output Data Set]

Example #1: SSI Frequency Table
RESULTS

Table of procCode by spcEvent								
procCode(Procedure Code)	spcEvent(Specific Event)							
Frequency Percent Row Pct Col Pct	BONE	DIP	GIT	IAB	JNT	OREP	SIP	Total
COLO	0 0.00 0.00 0.00	18 21.95 36.73 54.55	4 4.88 8.16 100.00	11 13.41 22.45 91.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	16 19.51 32.65 64.00	49 59.76
HPRO	2 2.44 12.50 100.00	6 7.32 37.50 18.18	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 3.66 18.75 60.00	0 0.00 0.00 0.00	5 6.10 31.25 20.00	16 19.51
HYST	0 0.00 0.00 0.00	6 7.32 60.00 18.18	0 0.00 0.00 0.00	1 1.22 10.00 8.33	0 0.00 0.00 0.00	1 1.22 10.00 100.00	2 2.44 20.00 8.00	10 12.20
KPRO	0 0.00 0.00 0.00	3 3.66 42.86 9.09	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 2.44 28.57 40.00	0 0.00 0.00 0.00	2 2.44 28.57 8.00	7 8.54
Total	2 2.44	33 40.24	4 4.88	12 14.63	5 6.10	1 1.22	25 30.49	82 100.00

Example #2: SSI SIR for Select Procedures 2011H1
Modifications to output option

Analysis SIR

Analysis Data Set: SIR_AllSSIProc Export Analysis Data Set

Modify Attributes of the Output:

Last Modified On: **05/02/2012**

Output Type: **SIR**

Output Name: SSI SIR for Select Procedures 2011H1

Output Title: SSI SIR for Select Procedures 2011H1

Select output format:

Output Format: HTML

☑ Use Variable Labels

The default output format is HTML, which means our results will appear in a pop-up browser window.

It is recommended that you check the box to "Use Variable Labels" so that you can obtain more descriptive column headings in your results.

Select a time period or Leave Blank for Cumulative Time Period:

Date Variable	Beginning	Ending
summaryYH	2011H1	2011H1

Clear Ti

☐ Enter Date variable/Time period at the time you click the Run b

summaryYH refers to calendar half-years. **2011H1** includes Jan-June 2011. The following filters would provide the same results:
summaryYQ 2011Q1 to 2011Q2
summaryYM 01/2011 to 06/2011

Specify Other Selection Criteria:

Show Criteria Column + Row + Clear Criteria

procCode				
IN (COLO, HPRO, HYST, KPRO)				

This section is used to limit your data by additional criteria. In this example, we want to limit to the SIR to 4 select procedures.

Other Options:

Print Variable Reference List

Group by: summaryYH

The "Group by" variable will give us one SIR per time period specified (e.g., one SIR per half-year). This variable does not have to match the time variable used above.

Run | Save | Save As | Reset | Back | Publish | Export Output Data Set

Example #2: SSI SIR for Select Procedures 2011H1
RESULTS

National Healthcare Safety Network

SSI SIR for Select Procedures 2011H1 - **By OrgID**

As of: May 16, 2012 at 8:01 AM

Date Range: SIR_ALLSSIPROC summaryYH 2011H1 to 2011H1

if (((procCode IN ("COLO", "HPRO", "HYST", "KPRO"))))

Org ID=10018

Org ID	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2011H1	1088	34	28.059	1.212	0.1521	0.839, 1.693

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.

Excludes Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs.

Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.

Source of aggregate data: 2006-2008 NHSN SSI Data

Data contained in this report were last generated on May 11, 2012 at 2:57 PM.

National Healthcare Safety Network

SSI SIR for Select Procedures 2011H1 - **By OrgID/ProcCode**

As of: May 16, 2012 at 8:01 AM

Date Range: SIR_ALLSSIPROC summaryYH 2011H1 to 2011H1

if (((procCode IN ("COLO", "HPRO", "HYST", "KPRO"))))

Org ID=10018

Org ID	Procedure Code	Summary Yr/Half	Procedure Count	All SSI Model Infection Count	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	COLO	2011H1	258	19	15.855	1.198	0.2454	0.721, 1.871
10018	HPRO	2011H1	277	6	4.881	1.229	0.3632	0.451, 2.676
10018	HYST	2011H1	183	5	2.543	1.966	0.1146	0.638, 4.588
10018	KPRO	2011H1	370	4	4.780	0.837	0.4799	0.228, 2.143

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.

Excludes Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs.

Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.

Source of aggregate data: 2006-2008 NHSN SSI Data

Data contained in this report were last generated on May 11, 2012 at 2:57 PM.

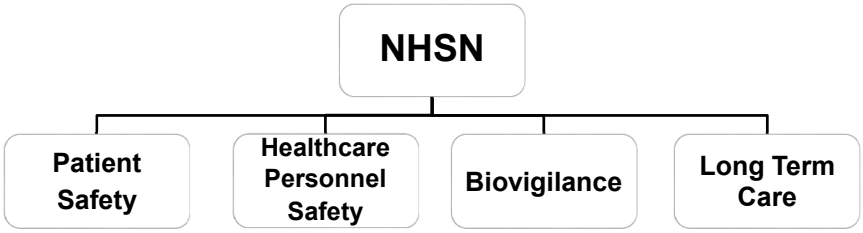
Please place tab here with the number and title 10. SSI Surveillance. Presentation should be double sided, black and white, and 2 slides per page.

Surgical Site Infection (SSI) Surveillance

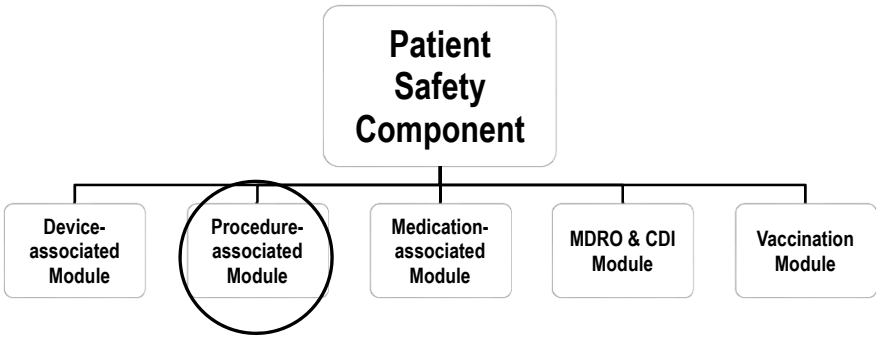
Teresa C. Horan, MPH
Gloria C. Morrell, RN, MSN, CIC
October 3, 2012

Nothing to Disclose

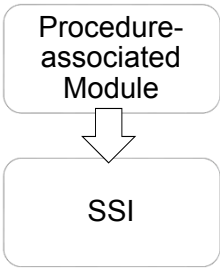
NHSN Structure 3 Components



Patient Safety Component 5 Modules



Procedure-associated Module



SSI Surgical site infection

Post-procedure pneumonia (PPP) is being retired at end of 2012

Resources for SSI Surveillance

- NHSN Forms (January 2013)
  - 57.106: Monthly Reporting Plan
  - 57.120: Surgical Site Infection
  - 57.121: Denominator for Procedure

Resources for SSI Surveillance

- NHSN Patient Safety Component Manual, January 2013
  - Ch 1: NHSN Overview: Surveillance Techniques
  - Ch 3: Monthly Reporting Plan
  - Ch 9: SSI Protocol, Forms, and Tables of Instructions
  - Ch 16: Key Terms
  - Ch 17: Infection Site Definitions

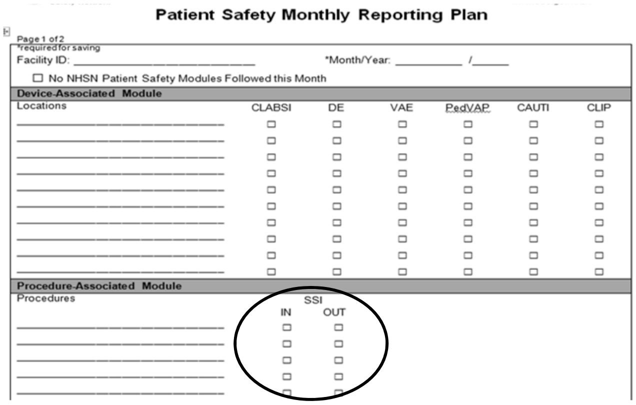
http://www.cdc.gov/nhsn/TOC_PSCManual.html

Monthly Reporting Plan

- Plans are the roadmap to your data
- Only data included in Plans will be used by CDC in aggregate data analysis (i.e., only “in-Plan” data)
- Plans drive much of the business logic of the NHSN application
- Must have one for every month of the year

Changes to Plan in 2013 for PA Module

- No Post-procedure Pneumonia (PPP)
- For SSI, no choice for “Both” but will be able to indicate that both in- and out-patients are being monitored for SSI



Patient Safety Monthly Reporting Plan

Page 1 of 2
*required for saving

Facility ID: ______________________ *Month/Year: _________ /_____

☐ No NHSN Patient Safety Modules Followed this Month

Device-Associated Module

Locations	CLABSI	DE	VAE	PedVAP	CAUTI	CLIP
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐
____________	☐	☐	☐	☐	☐	☐

Procedure-Associated Module

Procedures	SSI	
	IN	OUT
____________	☐	☐
____________	☐	☐
____________	☐	☐
____________	☐	☐
____________	☐	☐

SSI - Active Surveillance Methods

- Determine which surgical patients you will monitor
- Review admission, readmission, and OR logs
- Review patient charts for signs and symptoms of SSI, risk factors
- Review lab, Xray, other diagnostic test reports
- Review nurses and physician notes
- Visit the ICU and wards – talk to primary care staff

Post-discharge SSI Surveillance Methods

- Surgeon and/or patient surveys by mail or phone
  - Develop a tool that includes the SSI and most common specific infection site criteria for the operative procedures being monitored
  - Train surgeons and their office staff
- Review of postoperative clinic records

Criteria must be met regardless of where the SSI is detected!

CMS Reporting via NHSN – Current Requirements
(as of 5/9/2012)

HAI Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals: Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals: Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals: Inpatient COLO and HYST Procedures	January 2012
I.V. antimicrobial start	Outpatient Dialysis Facilities	January 2012
Positive blood culture	Outpatient Dialysis Facilities	January 2012
Signs of vascular access infection	Outpatient Dialysis Facilities	January 2012
CLABSI	Long Term Care Hospitals*: Adult and Pediatric LTAC ICUs and Wards	October 2012
CAUTI	Long Term Care Hospitals*: Adult and Pediatric LTAC ICUs and Wards	October 2012
CAUTI	Inpatient Rehabilitation Facilities: Adult and Pediatric IRF Wards	October 2012
MRSA Bacteremia LabID Event	Acute Care Hospitals: FacWideIN	January 2013
C. difficile LabID Event	Acute Care Hospitals: FacWideIN	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Ambulatory Surgical Centers	October 2014

* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN

NHSN and CMS

- COLO and HYST must be included in your Monthly Reporting Plans every month for data to be reported on your behalf to CMS
- Must follow the NHSN SSI protocol exactly and report complete and accurate data in a timely manner
  - Report each SSI detected or indicate that no SSI occurred
  - Report each COLO and HYST performed on inpatients

http://www.cdc.gov/nhsn/PDFs/FINAL-ACH-SSI-Guidance.pdf

NHSN and CMS

- A subset of SSI following in-Plan, inpatient COLO and HYST procedures are used to fulfill CMS reporting requirements:
  - ≥18 year old patient at time of surgery
  - Deep incisional primary or organ/space SSI
  - Detected by all surveillance methods (A, P, RF, RO) within 30 days of date of procedure
- The risk models used to calculate the expected number of SSI for the SIR are based only on the patient's age and ASA score

http://www.cdc.gov/nhsn/PDFs/FINAL-ACH-SSI-Guidance.pdf

COLO and HYST

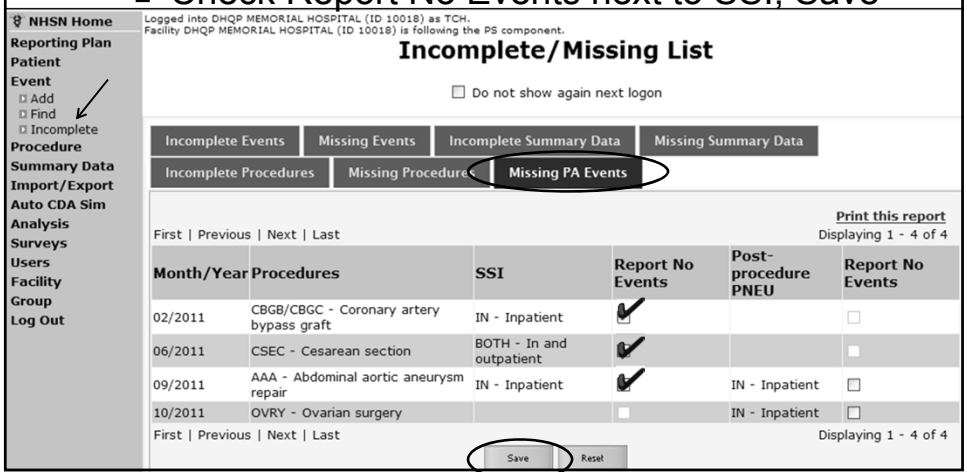
Legacy Code	Operative Procedure	Description	ICD-9-CM Codes / CPT Codes
COLO	Colon surgery	Incision, resection, or anastomosis of the large intestine; includes large-to-small and small-to-large bowel anastomosis; does not include rectal operations	17.31-17.36, 17.39, 45.03, 45.26, 45.41, 45.49, 45.52, 45.71-45.76, 45.79, 45.81-45.83, 45.92-45.95, 46.03, 46.04, 46.10, 46.11, 46.13, 46.14, 46.43, 46.52, 46.75, 46.76, 46.94
			44140, 44141, 44143, 44144, 44145, 44146, 44147, 44150, 44151, 44160, 44204, 44205, 44206, 44207, 44208, 44210
HYST	Abdominal hysterectomy	Abdominal hysterectomy; includes that by laparoscope	68.31, 68.39, 68.41, 68.49, 68.61, 68.69
			58150, 58152, 58180, 58200, 58210, 58541, 58542, 58543, 58544, 58548, 58570, 58571, 58572, 58573, 58951, 58953, 58954, 58956

HYST Reporting Detail

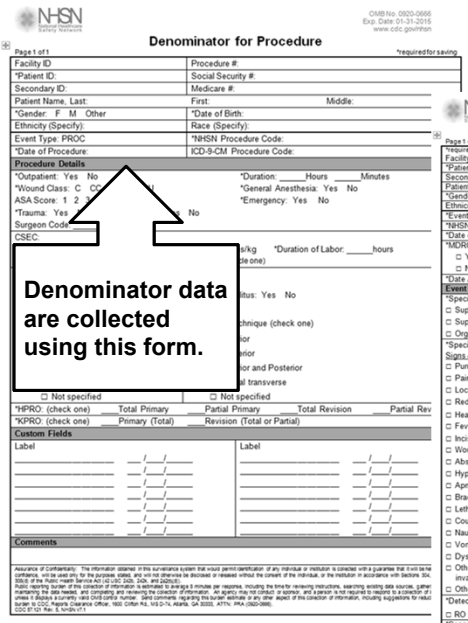
- Which structures and how they are detached (the surgical technique or approach), not the location of where the structures were physically removed, determines how the ICD-9-CM code is assigned
  - 68.41 – Laparoscopic total abdominal hysterectomy (HYST), even if uterus is removed through the vagina
  - 68.51 – Laparoscopically assisted vaginal hysterectomy (VHYS); vaginal incision

If you have no SSI to report…

- Click on Event → Incomplete
- Click on Missing PA Events tab
- Check Report No Events next to SSI; Save



SSI Surveillance Forms


Denominator for Procedure

Page 1 of 1

*required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No *Duration: _____Hours _____Minutes

*Wound Class: C CC *General Anesthesia: Yes No

ASA Score: 1 2 *Emergency: Yes No

*Trauma: Yes No

Surgeon Code:

CSEC:

*Duration of Labor: _____hours

☐ Not specified ☐ Not specified

*HPRO: (check one) ___Total Primary ___Partial Primary ___Total Revision ___Partial Rev

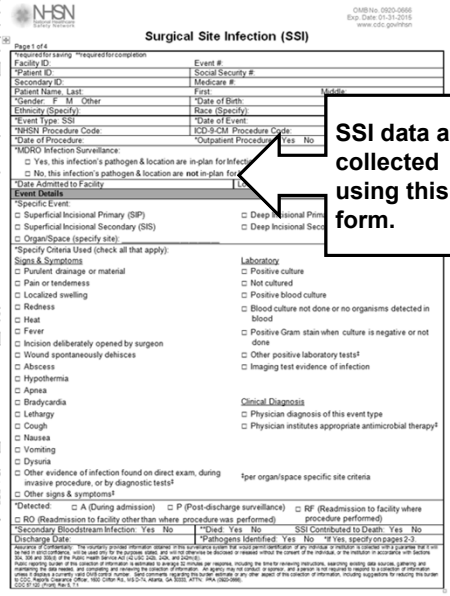
*KPRO: (check one) ___Primary (Total) ___Revision (Total or Partial)

Custom Fields

Label		Label	
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____

Comments

Denominator data are collected using this form.


Surgical Site Infection (SSI)

Page 1 of 4

*required for saving **required for completion

Facility ID:	Event #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
*Event Type: SSI	*Date of Event:
*NHSN Procedure Code:	ICD-9-CM Procedure Code:
*Date of Procedure:	*Outpatient Procedure: Yes No

*MDRO Infection Surveillance:

☐ Yes, this infection's pathogen & location are in-plan for Infecti

☐ No, this infection's pathogen & location are not in-plan for

*Date Admitted to Facility:

Event Details

*Specific Event:

☐ Superficial Incisional Primary (SIP) ☐ Deep Incisional Prim

☐ Superficial Incisional Secondary (SIS) ☐ Deep Incisional Seco

☐ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms

☐ Purulent drainage or material
☐ Pain or tendemess
☐ Localized swelling
☐ Redness
☐ Heat
☐ Fever
☐ Incision deliberately opened by surgeon
☐ Wound spontaneously dehisces
☐ Abscess
☐ Hypothermia
☐ Apnea
☐ Bradycardia
☐ Lethargy
☐ Cough
☐ Nausea
☐ Vomiting
☐ Dysuria
☐ Other evidence of infection found on direct exam, during invasive procedure, or by diagnostic tests[2]
☐ Other signs & symptoms[2]

Laboratory

☐ Positive culture
☐ Not cultured
☐ Positive blood culture
☐ Blood culture not done or no organisms detected in blood
☐ Positive Gram stain when culture is negative or not done
☐ Other positive laboratory tests[2]
☐ Imaging test evidence of infection

Clinical Diagnosis

☐ Physician diagnosis of this event type
☐ Physician institutes appropriate antimicrobial therapy[2]

[2]per organ/space specific site criteria

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ RF (Readmission to facility where procedure performed) ☐ RO (Readmission to facility other than where procedure was performed)

*Secondary Bloodstream Infection: Yes No **Died: Yes No SSI Contributed to Death: Yes No

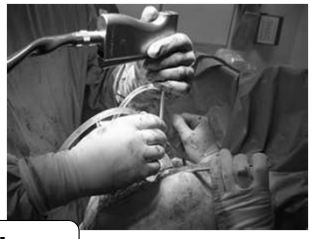
Discharge Date: *Pathogens Identified: Yes No *If Yes, specify on pages 2-3.

SSI data are collected using this form.

Key Term: NHSN Operative Procedure

A procedure that

1. is performed on a patient who is an NHSN inpatient or an NHSN outpatient,
2. takes place during an operation where a surgeon makes a skin or mucous membrane incision (including the laparoscopic approach) and primarily closes the incision before the patient leaves the operating room, and
3. is represented by an NHSN Operative Procedure Code



Skin-to-skin

Primary Closure

- Primary closure is defined as closure of all tissue levels, regardless of the presence of wires, wicks, drains, or other devices or objects extruding through the incision.
- However, regardless of whether anything is extruding from the incision, if the skin edges are not fully approximated for the entire length of the incision (e.g., are loosely closed with gaps between suture/staple points), the incision is not considered primarily closed and therefore the procedure would not be considered an operation. In such cases, any subsequent infection would not be considered an SSI, although it may be an HAI if it meets criteria for another specific infection site (e.g., skin or soft tissue infection).

Key Term: NHSN Inpatient

A patient whose date of admission to the healthcare facility and the date of discharge are *different* calendar days.

Key Term: NHSN Outpatient

A patient whose date of admission to the healthcare facility and the date of discharge are the *same* day

Key Term: Operating Room

- **A patient care area that met the Facilities Guidelines Institute or American Institute of Architects' criteria for an operating room when it was constructed or renovated.**
- **May include:**
  - **Traditional operating room**
  - **C-section room**
  - **Interventional radiology room**
  - **Cardiac catheterization lab**

NHSN Operative Procedure Codes

Each NHSN operative procedure category is defined by a group of ICD-9-CM procedure codes

Legacy Code	Operative Procedure	Description	ICD-9-CM Codes / CPT Codes
HTP	Heart transplant	Transplantation of heart	37.51-37.55
HYST	Abdominal hysterectomy	Abdominal hysterectomy; includes that by laparoscope	68.31, 68.39, 68.41, 68.49, 68.61, 68.69 58150, 58152, 58180, 58200, 58210, 58541, 58542, 58543, 58544, 58545, 58570, 58571, 58572, 58[illegible], 58951, 58953, 58954, [illegible]
KPRO	Knee prosthesis	Arthroplasty of knee	00.80[illegible] 81.54, 81.55
KTP	Kidney transplant	Transplantation of kidney	

CPT codes do not take precedence over ICD-9 codes when categorizing NHSN operative procedures.

NHSN Operative Procedures

When an NHSN Operative Procedure is selected for monitoring, <u>all</u> the procedures within that category must be followed.

Le[illegible] Code	Procedure	Descriptio[illegible]	ICD-9-CM Codes
AAA	Abdominal aortic aneurysm repair	Resection of a[illegible] aorta with anastom[illegible] replacement	38.34, 38.44, 38.64
AMP	Limb amputation	Total or partial amputation or disarticulation of the upper or lower limbs, including digits	84.00-84.19, 84.91
APPY	Appendix surgery	Operation of appendix (not incidental to another procedure)	47.01, 47.09, 47.2, 47.91, 47.92, 47.99
AVSD	Shunt for dialysis	Arteriovenostomy for renal dialysis	39.27, 39.42

Completing the Denominator for Procedure Form

Denominator Data

- **The surveillance period is one month.**
- **Complete a Denominator for Procedure record for <u>every</u> operation meeting the NHSN operative procedure definition that was done during that month if it is in your Monthly Reporting Plan.**
- **Submit data within a month of the end of this period.**

NHSN Patient Safety Network

OMB No. 0920-0666
Exp. Date 01-31-2015
www.cdc.gov/nhsn

Denominator for Procedure

Page 1 of 1

*required for saving

Facility ID:	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
*Scope: Yes No
Surgeon Code:_____

*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No
*Emergency: Yes No

CSEC:
*Height: _____feet _____inches (choose one) _____meters
*Weight: _____lbs/kg (circle one)
*Duration of Labor: _____hours

Circle one: FUSN RFUSN
*Spinal Level (check one)
- ☐ Atlas-axis
- ☐ Atlas-axis/Cervical
- ☐ Cervical
- ☐ Cervical/Dorsal/Dorsolumbar
- ☐ Dorsal/Dorsolumbar
- ☐ Lumbar/Lumbosacral
- ☐ Not specified

*Diabetes Mellitus: Yes No

*Approach/Technique (check one)
- ☐ Anterior
- ☐ Posterior
- ☐ Anterior and Posterior
- ☐ Lateral transverse
- ☐ Not specified

*HPRO: (check one) ____Total Primary ____Partial Primary ____Total Revision ____Partial Revision
*KPRO: (check one) ____Primary (Total) ____Revision (Total or Partial)

Custom Fields

Label		Label	
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____

Comments

Assurance of Confidentiality: The information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 308 and 309(d) of the Public Health Service Act (42 USC 242b, 242d, and 242m(d)).
Public reporting burden of this collection of information is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Reports Clearance Officer, 1600 Clifton Rd, MS D-74, Atlanta, GA 30333, ATTN: PRA (0920-0666).
CDC 57.121 Rev. 5, NHSN-V7.1

Denominator for Procedure

For example, if your Monthly Reporting Plan indicates that you will monitor COLO procedures in January, and 43 COLO were done that month, then you should enter / import 43 separate COLO procedure records into NHSN by the end of February.

Procedure-Associated Module HELP

Procedures	SSI
COLO - Colon surgery	IN - Inpatient
HYST - Abdominal hysterectomy	IN - Inpatient

Denominator for Procedure

Patient Information:
Patient ID, Gender, and Date of Birth are required.

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
*Scope: Yes No
Surgeon Code: _____
*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No
*Emergency: Yes No

Procedure Code and Procedure Date

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
Surgeon Code: _____

*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No

The NHSN Procedure Code and the Date of Procedure must be entered.
The ICD-9-CM code is optional.

If you enter the ICD-9 code first, the NHSN procedure code will be automatically populated.

White

Procedure Information HELP

NHSN Procedure Code*:
ICD-9-CM Code: 38.44
Procedure Date*:
Link/Unlink to Event *Procedure is not Linked*

Procedure Information HELP

NHSN Procedure Code*: AAA - Abdominal aortic aneurysm repair
ICD-9-CM Code: 38.44
Procedure Date*:
Link/Unlink to Event *Procedure is not Linked*

Important Note

- In Chapter 9, the Reporting Instructions in the Denominator Data section and the Table of Instructions provide important guidance on the many nuances of how to report the number of operative procedure records and their details in a variety of situations.
- The examples shown in this presentation are only some of them.
- Please read and follow all of the instructions carefully!

Reporting Instructions

- Some operative procedures have more than one incision
  - CBGB, and certain operations in the CEA, FUSN, RFUSN, and PVBY categories
  - Example: CBGB in which an incision to harvest a donor vessel is made that is separate from the primary incision
  - Example: FUSN with both anterior and posterior approaches
- Complete only one *Denominator for Procedure* form
  - Record the duration as time from first skin incision to primary closure of last incision

Procedure Details – Outpatient and Duration

Denominator for Procedure

Page 1 of 1

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure
*Date of Procedure:	ICD-9-CM Procedure Co

Procedure Details

*Outpatient: Yes No

*Wound C CC CO D U

ASA Score 4 5

*Duration: _____Hours _____Minutes

*General Anesthesia: Yes No

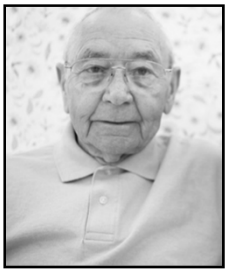
*Emergency: Yes No

Duration:
Required.
Record the hours and minutes between the skin incision and skin closure.
Do not record anesthesia time!

Outpatient:
Required.
If admission and discharge dates are the same calendar date, select Yes; otherwise, select No.

Reporting Instruction

- If procedures in more than one NHSN operative procedure category are done *through the same incision* during the same trip to the OR, create a record for each procedure that you are monitoring in the Monthly Reporting Plan, and use the total time for the duration for each record.



Example: Patient had a coronary artery bypass graft with a chest incision only (CBGC) and also a mitral valve replacement (CARD). The time from skin incision to skin closure was 5 hours. A *Denominator for Procedure* form is completed for the CBGC and another for the CARD, indicating the duration as 5 hours and 0 minutes on each form.

Reporting Instruction

- EXCEPTION: If a patient has both a CBGC and a CBGB during the same trip to the OR, report only as a CBGB.

Example: Patient was scheduled to have a coronary artery bypass graft with a chest incision only (CBGC), however during the procedure it became necessary to harvest a vessel from the leg. Even though an ICD-9-CM procedure code for a CBGC and a CBGB will be assigned by coders, only complete a CBGB *Denominator for Procedure* form. The time from chest skin incision to chest primary closure is reported for the duration of the procedure.

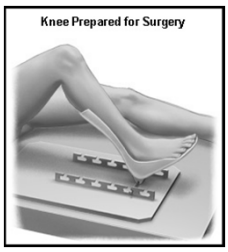
Reporting Instruction

- If the patient goes to the OR more than once during the same admission and another procedure of the same or different NHSN operative procedure category is performed through the same incision within 24 hours of the end of the original incision, report only one *Denominator for Procedure* form for the original procedure combining the durations for both procedures.

Example: Patient had colon surgery (COLO) performed on Tuesday morning which had a duration of 3 hours and 10 minutes. On Tuesday evening, he was returned to the OR where the COLO incision was opened to repair a bleeding vessel (OTH). The duration of the second procedure was 1 hour and 10 minutes.

Report only one COLO with a combined duration of 4 hours and 20 minutes. Do not report an OTH record.

Reporting Instruction: Bilateral Procedures



- For procedures that can be performed bilaterally during the same trip to the OR (e.g., KPRO), two separate *Denominator for Procedure* forms are completed.

- To document the duration of the procedure, indicate the incision time to closure for each procedure separately or, alternatively, take the total time for both procedures and split it evenly between the two.

Procedure Details – Wound Class

Denominator for Procedure

Page 1 of 1

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure
*Date of Procedure:	ICD-9-CM Proced
Procedure Details	
*Outpatient: Yes No	*Dur
*Wound Class: C CC CO D U	*Gen
ASA Score: 1 2 3 4 5	*Em
*Traum	No
Surge	

C = Clean
CC = Clean – Contaminated
CO = Contaminated
D = Dirty
U = Unknown

- Wound class is an assessment of the likelihood and degree of contamination of a surgical wound <u>at the time of</u> the operation.
- It should be assigned by a person directly involved in performing the operation; rarely by the IP.

Wound Class

Clean (I)
- ❑ Uninfected wound with no inflammation
- ❑ Respiratory, alimentary, genital or uninfected urinary tract are not entered
- ❑ Primarily closed
- ❑ Closed drainage, if needed

Clean-Contaminated (II)

- ❑ Respiratory, alimentary, genital, or urinary tracts entered under controlled conditions and without unusual contamination
- ❑ Include operations on biliary tract, appendix, vagina, oropharynx if no evidence of infection or major break in technique

Wound Class

Contaminated (III)

- ❑ Open, fresh, accidental wounds
- ❑ Major breaks in sterile technique or gross spillage from the GI tract
- ❑ Includes incisions into acute, nonpurulent inflamed tissues

Dirty or Infected (IV)

- ❑ Old traumatic wounds with retained devitalized tissue
- ❑ Wounds involving existing clinical infection or perforated viscera

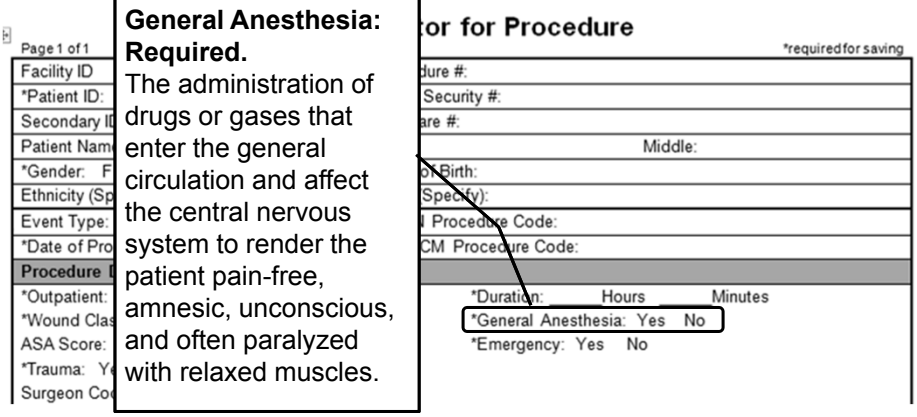
Note: NHSN allows "unknown" to be reported through 2013, however, the procedure will not be included in the aggregate pool or your facility's risk-adjusted metrics.

Wound Class Cases

Case	Wound Class
Susanne had an appendectomy following 2 days of acute abdominal pain with rebound tenderness. At the end of the case, the surgeon indicates that the appendix had ruptured and the surgical area was irrigated and cefoxitin was ordered for 3 days postoperatively.	3
Fred had a cholecystectomy using a laparoscopic technique. The gallbladder was removed successfully with no breaks in operative asepsis.	2
George had a KPRO revision. When the surgeon makes the incision into the surgical site, she notes that the knee joint demonstrates purulent material and inflammation. A specimen is obtained and sent to the laboratory which grows *S. aureus* (MSSA).	4
Mary had a scheduled, uneventful abdominal hysterectomy.	2

Procedure Details – General Anesthesia

General Anesthesia: Required.
The administration of drugs or gases that enter the general circulation and affect the central nervous system to render the patient pain-free, amnesic, unconscious, and often paralyzed with relaxed muscles.



Procedure Details – ASA Class

ASA Class: Required.
An assessment score by the anesthesiologist of the patient's preoperative physical condition using the American Society of Anesthesiologists' Classification of Physical Status schema.

Denominator for Pr

Page 1 of 1

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

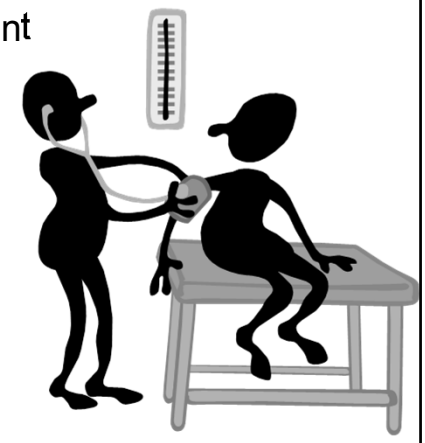
Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
*Scope: Yes No
Surgeon Code: _____
*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No
*Emergency: Yes No

ASA Class

- Required only for inpatient procedures

1. Normally healthy patient
2. Patient with mild systemic disease
3. Patient with severe systemic disease that is not incapacitating
4. Patient with an incapacitating systemic disease that is a constant threat to life
5. Moribund patient who is not expected to survive for 24 hours with or without operation



Procedure Details – Emergency

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No *Scope: Yes No
Surgeon Code: _____
*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No
*Emergency: Yes No

Emergency:
Required.
Select Yes if this operative procedure was a nonelective and unscheduled operation; otherwise, select No.

Procedure Details – Trauma

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
Surgeon Code: _____
*Duration: _____Hours _____Minutes

Trauma:
Required.
If this operation was done because of blunt or penetrating trauma, select Yes.

Procedure Details – Scope

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Seco	Medicare #:
Patie	First: Middle:
*Gen	*Date of Birth:
Ethni	Race (Specify):
Even	*NHSN Procedure Code:
*Dat	ICD-9-CM Procedure Code:
Proc	
*Out	
*Wou	
ASA Score: 1 2 3 4 5	
*Trauma: Yes No	*Scope: Yes No
Surgeon Code: _____	

Scope:
Required.
If the entire NHSN operative procedure was performed using a laparoscope/robotic assist, select Yes.

Select No if incision was extended for hand assist or fully converted to an open approach.

Select Yes if scope used for HYST or VHYS even if uterus was removed through the vagina.

Select Yes if scope used to harvest donor vessel during a CBGB.

Procedure Details – Surgeon Code

Denominator for Procedure

Page 1 of 1 *required for saving

Facility ID	Procedure #:
*Patient ID	curity #:
Secondary	#:
Patient Na	Middle:
*Gender:	Birth:
Ethnicity (S	ecify):
Event Typ	rocedure Code:
*Date of Procedu	ICD-9-CM Procedure Code:
Procedure Det	
*Outpatient: Y o	*Duration: _____Hours _____Minutes
*Wound Clas CC CO D U	*General Anesthesia: Yes No
ASA Score 2 3 4 5	*Emergency: Yes No
*Trauma: Yes No	*Scope: Yes No
Surgeon Code:	

Surgeon Code:
Optional.
Enter the code of the surgeon who performed the principal operative procedure.

If more than one surgeon performed the operation, enter the code for the surgeon who was primarily responsible for the case.

Procedure Details – Implant

- No longer required!
- Instead certain operative procedures will require monitoring for deep incisional or organ/space SSI for either 30 days or 90 days
- Implant definition too broad which limited its usefulness as an SSI stratifier
- Also too difficult to collect

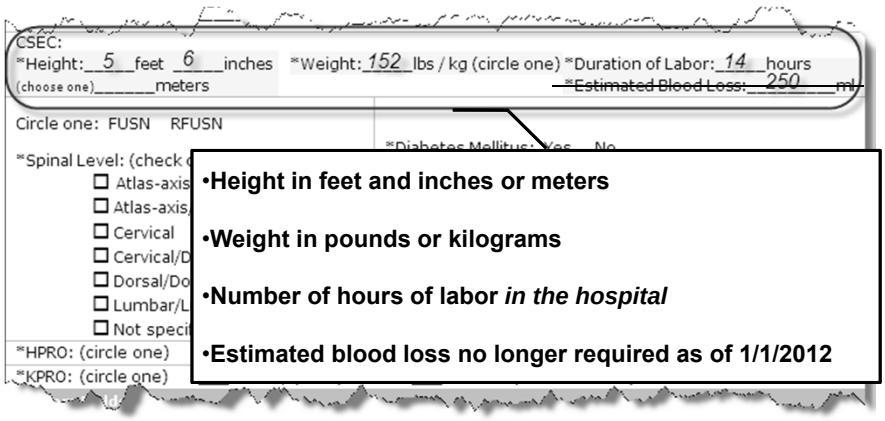
Additional Fields Required for Specific Procedures

Additional Fields for Specific Procedures

- There are 5 procedures for which additional risk factors are collected:
  - Cesarean Section – CSEC
  - Spinal Fusion and Refusion – FUSN; RFUSN
  - Hip Arthroplasty – HPRO
  - Knee Arthroplasty – KPRO

When any of the above procedures are included in the *Monthly Reporting Plan*, the corresponding additional fields must be completed.

Cesarean Section – CSEC

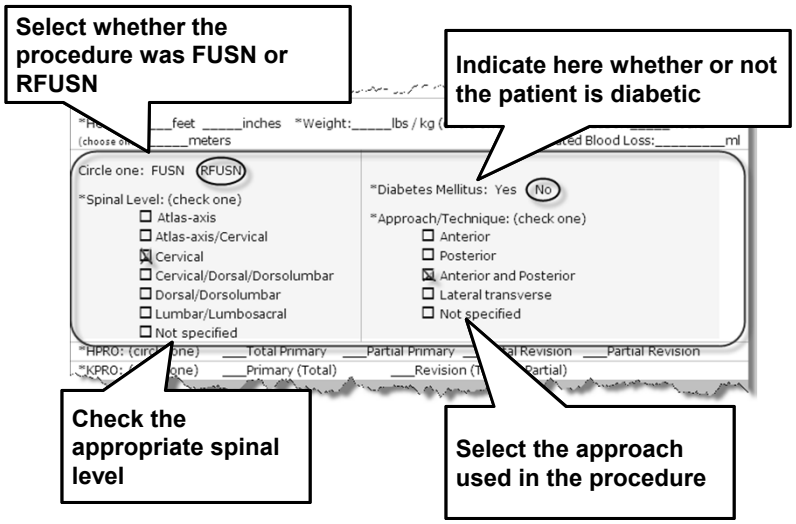


- **Height in feet and inches or meters**
- **Weight in pounds or kilograms**
- **Number of hours of labor *in the hospital***
- **Estimated blood loss no longer required as of 1/1/2012**

Reporting Instruction: Labor

- Length of time from beginning of active labor as an inpatient to delivery of the infant, expressed in hours (if ≤30 min, round down; >30 min, round up; if none, enter 0)
- Check for documentation in chart
- May be defined by your hospital's policies and procedures but should reflect the onset of regular contractions or induction that leads to delivery during this admission

Fusion (FUSN) and Refusion (RFUSN)



Hip Arthroplasty – HPRO

CSEC:
*Height:_____feet _____inches *Weight:_____lbs / kg (circle one) *Duration of Labor:_____hours
(choose one)_____ lood Loss:_____ml

Circle one: FUSN

*Spinal Level: (ch

- ☐ Atlas-
- ☐ Atlas-axis/Cervic
- ☐ Cervical
- ☐ Cervical/Dorsal/ nbar
- ☐ Dorsal/Dorsolu
- ☐ Lumbar/Lumb cral
- ☐ Not specified

- ☐ Anterior
- ☐ Posterior
- ☐ Anterior and Posterior
- ☐ Lateral transverse
- ☐ Not specified

*HPRO: (circle one) ___Total Primary ___Partial Primary ___Total Revision ___Partial Revision
*KPRO: (circle one) ___Primary (Total) ___Revision (Total or Partial)

If the procedure is HPRO, indicate here which type of HPRO was performed

Knee Arthroplasty – KPRO

CSEC:
*Height:_____feet _____inches *Weight:_____lbs / kg (circle one) *Duration of Labor:_____hours
(choose one)_____meters *Estimated Blood Loss:_____ml

Circle one: FUSN RFUSN

*Spinal Level: (check one)

- ☐ Atlas-axis
- ☐ Atlas-axis/Cervic
- ☐ Cervical
- ☐ Cervical/Dorsal/D
- ☐ Dorsal/Dorsolum
- ☐ Lumbar/Lumbosac
- ☐ Not specified

us: Yes No
nique: (check one)
ior
erior
ior and Posterior
al transverse
☐ Not specified

*HPRO: (circle one) ___Total Primary ___Partial Primary ___Total Revision ___Partial Revision
*KPRO: (circle one) ___Primary (Total) ___Revision (Total or Partial)

If the procedure is KPRO, indicate here which type of KPRO was performed

NHSN Patient Safety Network

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Denominator for Procedure

Page 1 of 1

*required for saving

Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No
*Wound Class: C CC CO D U
ASA Score: 1 2 3 4 5
*Trauma: Yes No
*Scope: Yes No
Surgeon Code: _____
*Duration: _____Hours _____Minutes
*General Anesthesia: Yes No
*Emergency: Yes No

CSEC:
*Height: _____feet _____inches (choose one) _____meters
*Weight: _____lbs/kg (circle one)
*Duration of Labor: _____hours

Circle one: FUSN RFUSN
*Spinal Level (check one)
- ☐ Atlas-axis
- ☐ Atlas-axis/Cervical
- ☐ Cervical
- ☐ Cervical/Dorsal/Dorsolumbar
- ☐ Dorsal/Dorsolumbar
- ☐ Lumbar/Lumbosacral
- ☐ Not specified

*Diabetes Mellitus: Yes No

*Approach/Technique (check one)
- ☐ Anterior
- ☐ Posterior
- ☐ Anterior and Posterior
- ☐ Lateral transverse
- ☐ Not specified

*HPRO: (check one) ____Total Primary ____Partial Primary ____Total Revision ____Partial Revision
*KPRO: (check one) ____Primary (Total) ____Revision (Total or Partial)

Custom Fields

Label		Label	
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____

Comments

Assurance of Confidentiality: The information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 308 and 306(d) of the Public Health Service Act (42 USC 242b, 242k, and 242m(d)).

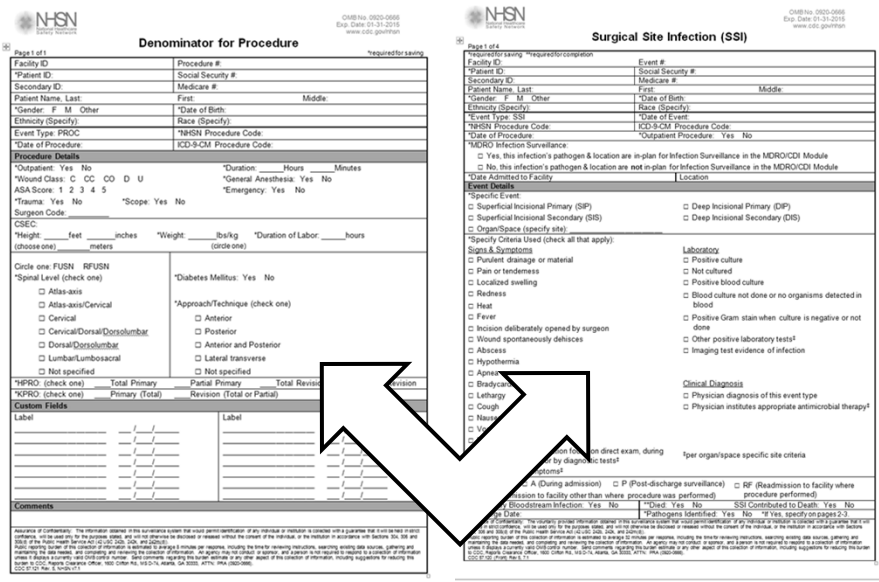
Public Burden Statement: This data collection is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Reports Clearance Officer, 1600 Clifton Rd., N-E-21, Atlanta, GA 30333, ATTN: PRA (0920-0666).

CDC 51.121 Rev. 8, NHSN-V1.1

Summary

- Complete and enter or import a *Denominator for Procedure* record for every NHSN operative procedure performed that is selected for surveillance.
- Use the SSI Protocol, Tables of Instructions, and Key Terms chapters of the Patient Safety Manual for guidance.

Linking and Importing Records



Denominator for Procedure and SSI records must be LINKED so that the correct risk factor data are matched to the SSI for a given patient.

Linking Procedure and SSI Records

1. Enter the Denominator for Procedure record
2. Enter the SSI record
3. Link the two records

Step 2

When SSI is selected from the Event Type field, the link button automatically appears on the screen and message indicates that the event is not linked. Click on the button. Don't need to enter the procedure data.

Event Information

Event Type*: SSI - Surgical Site Infection Date of Event

NHSN Procedure Code*:

ICD-9-CM Code:

Procedure Date*: Link/Unlink to Procedure *Event is not Linked*

Location:

Date Admitted to Facility>:

A new screen appears listing all the operative procedures this patient has had.

Check the box next to the appropriate procedure, and click on the "Link/Unlink" button.

Link Procedure List

Check the procedure to link this Event to and click Link

Patient ID: 200803-53

First | Previous | Next | Last

Link/Unlink	Event #	NHSN Procedure Code	ICD-9-CM Code	Procedure Date
☑	992843	HPRO		03/05/2008

First | Previous | Next | Last

Link/Unlink Back

Event Information

Event Type*: SSI - Surgical Site Infection Date of Event*:

NHSN Procedure Code*: HPRO - Hip prosthesis

ICD-9-CM Code:

Procedure Date*: 03/05/2008 Link/Unlink to Procedure **Event Linked**

Location*:

Date Admitted to Facility*:

After linking an SSI to its corresponding procedure, the remainder of the SSI form must still be completed and the record saved for linking to occur.

Event Information

Event Type*: SSI - Surgical Site Infection Date of Event*: 04/26/2008

NHSN Procedure Code*: HPRO - Hip prosthesis

ICD-9-CM Code:

Procedure Date*: 03/05/2008 Link/Unlink to Procedure **Event Linked**

Location*: 4 SOUTH - 4 SOUTH - SURGICAL

Date Admitted to Facility*: 03/05/2008

After clicking SAVE…

NHSN

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Denominator for Procedure

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Facility ID	Procedure #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
Event Type: PROC	*NHSN Procedure Code:
*Date of Procedure:	ICD-9-CM Procedure Code:

Procedure Details

*Outpatient: Yes No *Duration: _____Hours _____Minutes
*Wound Class: C CC CO D U *General Anesthesia: Yes No
ASA Score: 1 2 3 4 5 *Emergency: Yes No
*Trauma: Yes No *Scope: Yes No
Surgeon Code: _____
CSEC:
*Height: _____feet _____inches (choose one) _____meters *Weight: _____lbs/kg (circle one) *Duration of Labor: _____hours

Circle one: FUSN RFUSN
*Spinal Level (check one)
- ☐ Atlas-axis
- ☐ Atlas-axis/Cervical
- ☐ Cervical
- ☐ Cervical/Dorsal/Dorsolumbar
- ☐ Dorsal/Dorsolumbar
- ☐ Lumbar/Lumbosacral
- ☐ Not specified

*Diabetes Mellitus: Yes No

*Approach/Technique (check one)
- ☐ Anterior
- ☐ Posterior
- ☐ Anterior and Posterior
- ☐ Lateral transverse
- ☐ Not specified

*HPRO: (check one) ____Total Primary ____Partial Primary ____
*KPRO: (check one) ____Primary (Total) ____Revision (Total or Partial)

Custom Fields

Label		Label	
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____
_____	__/__/____	_____	__/__/____

Comments

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Public reporting burden of this collection of information is estimated to average 2 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC Reports Clearance Officer, 1600 Clifton Rd., M/S D-74, Atlanta, GA 30333, ATTN: PRA (0920-0666).
CDC 57.120 Rev. 5, NHSN v7.1

All data are linked together

NHSN

OMB No. 0920-0666
Exp. Date: 01-31-2015
www.cdc.gov/nhsn

Surgical Site Infection (SSI)

Page 1 of 4 *required for saving **required for completion

Facility ID:	Event #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name, Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
*Event Type: SSI	*Date of Event:
*NHSN Procedure Code:	ICD-9-CM Procedure Code:
*Date of Procedure:	*Outpatient Procedure: Yes No

*MDRO Infection Surveillance:
- ☐ Yes, this infection's pathogen & location are in-plan for Infection Surveillance in the MDRO/CDI Module
- ☐ No, this infection's pathogen & location are **not** in-plan for Infection Surveillance in the MDRO/CDI Module

*Date Admitted to Facility Location

Event Details

*Specific Event:
- ☐ Superficial Incisional Primary (SIP)
- ☐ Superficial Incisional Secondary (SIS)
- ☐ Deep Incisional Primary (DIP)
- ☐ Deep Incisional Secondary (DIS)
- ☐ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms
- ☐ Purulent drainage or material
- ☐ Pain or tenderness
- ☐ Localized swelling
- ☐ Redness
- ☐ Heat
- ☐ Fever
- ☐ opened by surgeon
- ☐ ly dehisces
- ☐ fection found on direct exam, during invasive procedure, or by diagnostic tests[3]
- ☐ Other signs & symptoms[2]

Laboratory
- ☐ Positive culture
- ☐ Not cultured
- ☐ Positive blood culture
- ☐ Blood culture not done or no organisms detected in blood
- ☐ Positive Gram stain when culture is negative or not done
- ☐ Other positive laboratory tests[2]
- ☐ Imaging test evidence of infection

Clinical Diagnosis
- ☐ Physician diagnosis of this event type
- ☐ Physician institutes appropriate antimicrobial therapy[2]

[2]per organ/space specific site criteria

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ RF (Readmission to facility where procedure performed) ☐ RO (Readmission to facility other than where procedure was performed)

*Secondary Bloodstream Infection: Yes No **Died: Yes No SSI Contributed to Death: Yes No

Discharge Date: *Pathogens Identified: Yes No *If Yes, specify on pages 2-3.

Assurance of Confidentiality: The voluntarily provided information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 306 and 308(d) of the Public Health Service Act (42 USC 242b, 242k, and 242m(d)).
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CDC 57.120 (Page 1 of 4)

Importing Procedures

NHSN
- Join NHSN
- About NHSN
- Communication Updates
- Enrollment Requirements
- Patient Safety Component
- Healthcare Personnel Safety Component
- Biovigilance Component
- Data Collection Forms
- Training
- Data & Statistics
- ▶Resource Library

On This Page
- NHSN Guides
- Group Function Guides
- NHSN Codes and Variables
- Patient Safety Component Resources
- Healthcare Personnel Safety Component Resources
- Biovigilance Component Resources
- HIPAA
- FAQs

You will need help from your IT staff to create the file that will pull data from your Operating Room data systems.

- **Importing Patient Safety Procedure Data**
  NHSN allows the importation of operative procedures. The following documents provide information on the procedure import process, including the required file specifications.
  - How to Import Patient Safety Procedure Data [PDF - 0.8 MB] May 2011
  - Patient Safety Procedure Data Import File Specifications [PDF - 182 KB] February 2012
  - Sample Procedure Import File [CSV - 1 KB] February 2012

Importing Procedures

Importing Patient Safety Procedure Data

Importing Patient Safety Procedure Data

NHSN will allow importation of procedure data in an ASCII comma delimited text file format. You can generate the import files from different external sources, such as databases or hospital information systems. The default import option allows the importation of procedures where the procedure date occurs in a month for which a Monthly Reporting Plan exists and the Plan specifies the procedure code in the import file record. If you wish to import records for procedures not in the Plan, you must specify which procedures to include. Custom procedures can also be imported if they are first created on the custom options page.

NOTES:
1. Data in the import file must be in the same order as described in the table below, not as they appear on the Denominator for Procedure form.
2. The comma delimited text file format defined in the below table requires commas

http://www.cdc.gov/nhsn/PDFs/ImportingProcedureData_current.pdf

NHSN Procedure Import File Format**:

Field	Required/ Optional	Values	Format
Patient ID	Required		Character – Length 15
Gender	Required	M – Male F – Female	Character – Length 1
Date of Birth	Required		mm/dd/yyyy
NHSN Procedure Code	Required	See NHSN procedure codes below	Character – Length 5
Date of Procedure	Required		mm/dd/yyyy
Outpatient	Required	Y – Yes N - No Note: Some procedure may only be	Character – Length 1

	A	B	C	D	E	F	G
1	803-1	F	4/21/1980	CSEC	3/3/2008	N	9
2	803-2	F	6/14/1982	CHOL	3/3/2008	Y	
3	803-3	M	2/12/1977	CHOL	3/3/2008	Y	
4	803-4	F	10/10/1980	CSEC	3/3/2008	N	
5	803-5	F	1/12/1981	CSEC	3/6/2008	N	1
6	803-6	F	1/14/1978	CSEC	3/7/2008	N	
7	803-7	F	7/19/1980	CSEC	3/7/2008	N	
8	803-8	F	7/22/1985	CSEC	3/9/2008	N	
9	803-9	F	7/13/1984	CSEC	3/15/2008	N	
10	803-10	F	1/6/1984	CSEC	3/16/2008	N	
11	803-11	F	9/13/1975	CSEC	3/18/2008	N	
12	803-12	F	9/9/1979	CSEC	3/23/2008	N	
13	803-13	M	10/1/1982	SB	3/23/2008	N	
14	803-14	F	4/21/1980	HPRO	3/13/2008	N	
15	803-15	F	6/14/1982	CSEC	3/13/2008	N	1
16	803-16	F	2/12/1977	CSEC	3/23/2008	N	
17	803-17	F	10/10/1980	CSEC	3/13/2008	N	
18	803-18	F	1/12/1978	CSEC	3/26/2008	N	1
19	803-19	F	1/14/1978	CSEC	3/27/2008	N	
20	803-20	M	4/4/1928	HPRO	3/18/2008	N	
21							

Every field that is required on the *Denominator for Procedure* form is put into a column of the import document.

The following required fields on the *Denominator for Procedure* record are marked "optional for import".

✓ For CSEC patient:
- Height
- Weight
- Duration of labor

If not imported electronically, these fields will <u>still</u> have to be entered into the system manually!

Importing Procedures

SampleImport_withHeader.xls [Read-Only] [Compatibility Mode]

	A	B	C	D	E	F	G	H	I	J	K
1	patID	gender	dob	procCode	procDate	outpatien	durationH	durationM	wndClass	asa	scope
2	MD-2000	F	6/14/1941	AAA	12/10/2009	N	2	16	CC	2	N
3											
4											
5											

Note: If you create a "header row" with field names at the top, it must be <u>deleted</u> before the file is imported to NHSN!

In the NHSN application, select Import > Procedures and follow the instructions.

Additional Resources

- Mapping of ICD-9-CM Procedure Codes to NHSN Operative Procedure Categories

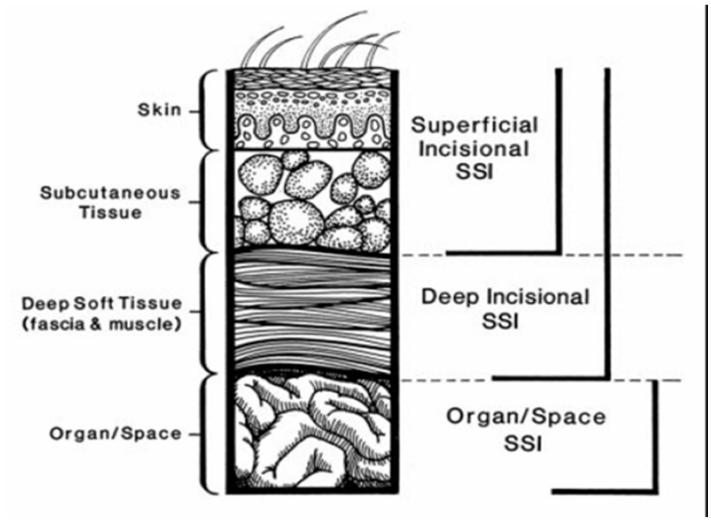
  http://www.cdc.gov/nhsn/XLS/ICD-9-cmCODEScurrent.xlsx
- Interactive Training Courses
  - Introduction to the Procedure-associated Module
  - SSI

Definitions of Surgical Site Infection

http://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf

http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf

SSI Definitions



Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. *Infect Control Hosp Epidemiol* **1992;13(10):606-8.**

Superficial Incisional SSI

A superficial incisional SSI (SIP or SIS) must meet the following criterion:

Infection occurs within 30 days after ~~the~~ **any NHSN** operative procedure **including those coded as 'OTH'**
and
involves only skin and subcutaneous tissue of the incision
and
patient has at least one of the following:

a. purulent drainage from the superficial incision
b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
c. at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
d. diagnosis of superficial incisional SSI by the surgeon or attending physician.

http://www.cdc.gov/nhsn/XLS/ICD-9-cmCODEScurrent.xlsx

Superficial Incisional SSI

Infection occurs within 30 days after any NHSN operative procedure, including those coded as 'OTH'

and

involves only skin and subcutaneous tissues of the incision

and

patient has at least one of the following:

a. purulent drainage from the superficial incision

b. organisms isolated from an aseptically-obtained culture of fluid or tissue from the superficial incision

Rearranged

c. superficial incision that is deliberately opened by a surgeon and is culture-positive or not cultured

and

patient has at least one of the following signs or symptoms: pain or tenderness; localized swelling; redness; or heat. A culture-negative finding does not meet this criterion.

d. diagnosis of a superficial incisional SSI by a surgeon or attending physician.

SIP and SIS

Superficial incisional primary (SIP)

A superficial incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions.
Examples:

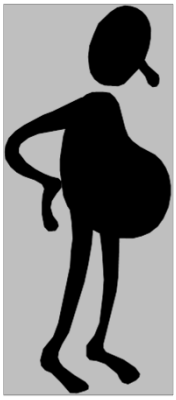
- C-section incision
- Chest incision for coronary artery bypass graft with a donor site [CBGB]

Superficial incisional secondary (SIS)

A superficial incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision. Example:

- Donor site incision for coronary artery bypass graft with a donor site [CBGB]

Example



Patient delivers a baby by C-Section on August 23. On her first postpartum visit to her surgeon on September 20, she notes yellow purulent drainage in the superficial incision.

Does Gretchen have a surgical site infection? **Yes**

Is it a superficial SSI? **Yes**

Is it an SIP or an SIS? **SIP**

Example

Patient underwent a coronary artery bypass graft (CBGB) in which the surgeon obtained a donor vessel from a site in Robert's left leg.

5 days postoperatively, patient had pain and edema in the leg incision. The surgeon opened the superficial incision, drained the pus, and irrigated the wound.

Does Robert have a superficial incisional SSI? **Yes**

Is it a SIS or SIP? **SIS**

Deep Incisional SSI

A deep incisional SSI (DIP or DIS) must meet the following criterion:

Infection occurs within 30 **or 90 days after the NHSN operative procedure** ~~days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure~~ **according to the list in Table 3**

and

involves deep soft tissues (e.g., fascial and muscle layers) of the incision

and

patient has at least one of the following:

a. purulent drainage from the deep incision ~~but not from the organ/space component of the surgical site~~
b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during **invasive procedure** ~~reoperation~~, or by histopathologic or **imaging test** ~~radiologic examination~~
d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

Deep Incisional SSI

Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 3

and

involves deep soft tissues of the incision (e.g., fascial and muscle layers)

and

patient has at least one of the following:

a. purulent drainage from the deep incision
b. a deep incision that spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured

   and

   patient has at least one of the following signs or symptoms: fever (>38°C); localized pain or tenderness. A culture-negative finding does not meet this criterion.

   Rearranged
c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during an invasive procedure, or by histopathologic examination or imaging test
d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

DIP and DIS

Deep incisional primary (DIP)

A deep incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions.
Examples:
- C-section incision
- Chest incision for coronary artery bypass graft with a donor site [CBGB]

Deep incisional secondary (DIS)

A deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision. Example:
- Donor site incision for coronary artery bypass graft with a donor site [CBGB]

Reporting Instructions

- Classify infection that involves both superficial and deep incisional sites as deep incisional SSI
- Classify infection that involves deep incisional and organ/space sites as deep incisional SSI
  - This may change in 2014

Organ/Space SSI

An organ/space SSI must meet the following criterion:

Infection occurs within 30 **or 90 days after the NHSN operative procedure** ~~days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure~~ **according to the list in Table 3**

and

infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure

and

patient has at least one of the following:

a. purulent drainage from a drain that is placed t~~hrough a stab wound~~ into the organ/space
b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, **invasive procedure** ~~during reoperation~~, or by histopathologic or **imaging test** ~~radiologic examination~~
d. diagnosis of an organ/space SSI by a surgeon or attending physician.

and

meets at least one criterion of a specific organ/space infection site listed in Table 4.

Organ/Space SSI

Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 3

and

involves deep soft tissues of the incision (e.g., fascial and muscle layers)

and

patient has at least one of the following:

a. purulent drainage from a drain that is placed into the organ/space
b. organisms isolated from an aseptically-obtained culture of fluid or tissue in the organ/space
c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, during invasive procedure, or by histopathologic examination or imaging test
d. diagnosis of an organ/space SSI by a surgeon or attending physician.

Table 3. *Surveillance Period for NHSN Operative Procedure Categories*

NEW!!

Only for DI and O/S SSI

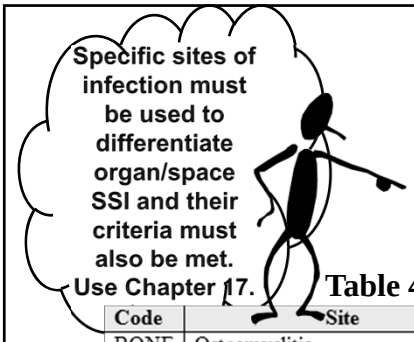
30-day Surveillance			
Code	**Operative Procedure**	**Code**	**Operative Procedure**
AAA	Abdominal aortic aneurysm repair	LAM	Laminectomy
AMP	Limb amputation	LTP	Liver transplant
APPY	Appendix surgery	NECK	Neck surgery
AVSD	Shunt for dialysis	NEPH	Kidney surgery
BILI	Bile duct, liver or pancreatic surgery	OVRY	Ovarian surgery
CEA	Carotid endarterectomy	PRST	Prostate surgery
CHOL	Gallbladder surgery	REC	Rectal surgery
COLO	Colon surgery	SB	Small bowel surgery
CSEC	Cesarean section	SPLE	Spleen surgery
GAST	Gastric surgery	THOR	Thoracic surgery
HTP	Heart transplant	THYR	Thyroid and/or parathyroid surgery
HYST	Abdominal hysterectomy	VHYS	Vaginal hysterectomy
KTP	Kidney transplant	XLAP	Exploratory Laparotomy

90-day Surveillance	
Code	**Operative Procedure**
BRST	Breast surgery
CARD	Cardiac surgery
CBGB	Coronary artery bypass graft with both chest and donor site incisions
CBGC	Coronary artery bypass graft with chest incision only
CRAN	Craniotomy
FUSN	Spinal fusion
FX	Open reduction of fracture
HER	Herniorrhaphy
HPRO	Hip prosthesis
KPRO	Knee prosthesis
PACE	Pacemaker surgery
PVBY	Peripheral vascular bypass surgery
RFUSN	Refusion of spine

Recap

- For any NHSN operative procedure, monitor for superficial SSI for 30 days only
- For selected NHSN operative procedures, monitor for deep incisional or organ/space SSI for either 30 days or 90 days (Table 3)

NEW!!



Organ/Space SSI

Table 4. Specific Sites of an Organ/Space SSI

Code	Site	Code	Site
BONE	Osteomyelitis	JNT	Joint or bursa
BRST	Breast abscess or mastitis	LUNG	Other infections of the respiratory tract
CARD	Myocarditis or pericarditis	MED	Mediastinitis
DISC	Disc space	MEN	Meningitis or ventriculitis
EAR	Ear, mastoid	ORAL	Oral cavity (mouth, tongue, or gums)
EMET	Endometritis	OREP	Other infections of the male or female reproductive tract
ENDO	Endocarditis	OUTI	Other infections of the urinary tract
EYE	Eye, other than conjunctivitis	SA	Spinal abscess without meningitis
GIT	GI tract	SINU	Sinusitis
HEP	Hepatitis	UR	Upper respiratory tract
IAB	Intraabdominal, not specified else-where	VASC	Arterial or venous infection
IC	Intracranial, brain abscess or dura	VCUF	Vaginal cuff

Present on Admission

- If a patient has a documented POA infection* in the organ/space being operated on in the first 2-day period of hospitalization, subsequent continuation of this infection type during the remainder of that hospitalization is <u>not</u> considered an organ/space SSI.
- However, if SSI becomes evident >2 calendar days after discharge** and within the surveillance period for the operative procedure, it is reportable as an organ/space SSI.
- If at any time during the surveillance period the incision becomes involved, report either SI or DI SSI as appropriate.
- A *Denominator for Procedure* form must still be completed.

***POA infection: occurs on day of admission or next day and fully meets a CDC/NHSN site-specific infection criterion**

****Day of discharge is Day 1**

POA Example 1

- On 8/1, patient presents to ED with acute abdomen and is admitted to the OR on the same day for colon resection (COLO). Peritoneal abscess noted due to perforations. Incision is closed primarily with a JP drain in an adjacent stab wound.
  - This infection is POA because it meets IAB criterion 1 on day of hospital admission.
- Even on antibiotics, patient continues to have low-grade fevers and purulent drainage via JP for next week of hospitalization.
  - This is <u>not</u> reported as an SSI-IAB.

POA Example 2

- 6/1: Patient admitted and primary KPRO performed
- 8/15: Readmit with signs and symptoms of joint infection
  - This is an SSI-JNT for the 6/1 KPRO (within 90d); is also POA in the organ/space site for the 8/15 admission
- 8/16: To OR for revision KPRO; antibiotic spacers placed
- 8/20: Meets criteria for SIP-SSI; this is reported
- 8/25: Discharged on long-term antibiotics
- 11/2: Readmit with signs and symptoms of joint infection
  - This is an SSI-JNT to the 8/15 KPRO because it occurred after discharge and within the 90 days surveillance period

Reporting Instructions

- In Chapter 9, the Reporting Instructions in the SSI criteria table, the Numerator Data section and the Table of Instructions provide important guidance on the many nuances of how to report SSI details in a variety of situations.
- The examples shown in this presentation are only some of them.
- Please read and follow all of the instructions carefully!

When a patient with an SSI has had more than one operation…

If a patient has several NHSN operations prior to an SSI, report the operation that was performed most closely in time prior to the infection date.

<u>Example</u>: Patient underwent a COLO on 2/12/13. Three days later, he went back to surgery to repair a leaking anastomosis (OTH). He developed an intraabdominal abscess on 2/28/13. This SSI is attributed to the second procedure (OTH), not the COLO.

If more than one operation is done through a single incision…

First, attempt to determine the procedure that is thought to be associated with the infection.

Example: If the patient had a CBGC and CARD done at the same time and develops an infected valve, then the SSI will be linked to the CARD.

If it's not clear (as in the case of a superficial incisional SSI), use the NHSN Principal Operative Procedure Selection Lists to select which operative procedure to report.

NHSN Principal Operative Procedure Category Selection Lists

- Five lists
  - Abdominal operations
  - Thoracic operations
  - Neurosurgical (spine) operations
  - Neurosurgical (brain) operations
  - Neck operations
- Categories with the highest risk of SSI are listed before those with lower risks
  - In 2013, order is COLO, SB, REC; currently order is SB, REC, COLO
  - In 2013, HYST is still before VHYS

Table 5. NHSN Principal Operative Procedure Category Selection Lists

Priority	Code	Abdominal Operations
1	LTP	Liver transplant
2	COLO	Colon surgery
3	BILI	Bile duct, liver or pancreatic surgery
4	SB	Small bowel surgery
5	REC	Rectal surgery
6	KTP	Kidney transplant
7	GAST	Gastric surgery
8	AAA	Abdominal aortic aneurysm repair
9	HYST	Abdominal hysterectomy
10	CSEC	Cesarean section
11	XLAP	Laparotomy
12	APPY	Appendix surgery
13	HER	Hemiorrhaphy
14	NEPH	Kidney surgery
15	VHYS	Vaginal Hysterectomy
16	SPLE	Spleen surgery
17	CHOL	Gall bladder surgery
18	OVRY	Ovarian surgery

continued…

Table 5. NHSN Principal Operative Procedure Category Selection Lists

Priority	Code	Thoracic Operations
1	HTP	Heart transplant
2	CBGB	Coronary artery bypass graft with donor incision(s)
3	CBGC	Coronary artery bypass graft, chest incision only
4	CARD	Cardiac surgery
5	THOR	Thoracic surgery
Priority	**Code**	**Neurosurgical (Spine) Operations**
1	RFUSN	Refusion of spine
2	CRAN	Crainiotomy
3	FUSN	Spinal fusion
4	LAM	Laminectomy
Priority	**Code**	**Neurosurgical (Brain) Operations**
1	VSHN	Ventricular shunt
2	RFUSN	Refusion of spine
3	CRAN	Craniotomy
4	FUSN	Spinal fusion
5	LAM	Laminectomy
Priority	**Code**	**Neck Operations**
1	NECK	Neck surgery
2	THYR	Thyroid and or parathyroid surgery

SSI after Laparoscopic Procedure

- If more than one of the laparoscopic/robotic incisions becomes infected, report only one SSI
  - If one is a superficial incisional SSI and another is a deep incisional SSI, report as a deep incisional SSI

Completing the SSI Event Form (Numerator)

Reporting SSIs

NHSN National Healthcare Safety Network

OMB No. 0920-0666
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www.cdc.gov/nhsn

Surgical Site Infection (SSI)

Page 1 of 4

*required for saving **required for completion

Facility ID:	Event #:
*Patient ID:	Social Security #:
Secondary ID:	Medicare #:
Patient Name. Last:	First: Middle:
*Gender: F M Other	*Date of Birth:
Ethnicity (Specify):	Race (Specify):
*Event Type: SSI	*Date of Event:
*NHSN Procedure Code:	ICD-9-CM Procedure Code:
*Date of Procedure:	*Outpatient Procedure: Yes No

*MDRO Infection Surveillance:
- ☐ Yes, this infection's pathogen & location are in-plan for Infection Surveillance in the MDRO/CDI Module
- ☐ No, this infection's pathogen & location are **not** in-plan for Infection Surveillance in the MDRO/CDI Module

*Date Admitted to Facility:	Location

Event Details

*Specific Event:

- ☐ Superficial Incisional Primary (SIP)
- ☐ Superficial Incisional Secondary (SIS)
- ☐ Deep Incisional Primary (DIP)
- ☐ Deep Incisional Secondary (DIS)
- ☐ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms
- ☐ Purulent drainage or material
- ☐ Pain or tenderness
- ☐ Localized swelling
- ☐ Redness
- ☐ Heat
- ☐ Fever
- ☐ Incision deliberately opened by surgeon
- ☐ Wound spontaneously dehisces
- ☐ Abscess
- ☐ Hypothermia
- ☐ Apnea
- ☐ Bradycardia
- ☐ Lethargy
- ☐ Cough
- ☐ Nausea
- ☐ Vomiting
- ☐ Dysuria
- ☐ Other evidence of infection found on direct exam, during invasive procedure, or by diagnostic tests‡
- ☐ Other signs & symptoms‡

Laboratory
- ☐ Positive culture
- ☐ Not cultured
- ☐ Positive blood culture
- ☐ Blood culture not done or no organisms detected in blood
- ☐ Positive Gram stain when culture is negative or not done
- ☐ Other positive laboratory tests‡
- ☐ Imaging test evidence of infection

Clinical Diagnosis
- ☐ Physician diagnosis of this event type
- ☐ Physician institutes appropriate antimicrobial therapy‡

‡per organ/space specific site criteria

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ RF (Readmission to facility where procedure performed) ☐ RO (Readmission to facility other than where procedure was performed)

*Secondary Bloodstream Infection: Yes No	**Died: Yes No	SSI Contributed to Death: Yes No
Discharge Date:	*Pathogens Identified: Yes No	*If Yes, specify on pages 2-3.

Assurance of Confidentiality: The voluntarily provided information obtained in this surveillance system that could permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 308 and 308(d) of the Public Health Service Act (42USC 242b, 242k, and 242m(d)).

Public reporting burden of this collection of information is estimated to average 32 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Reports Clearance Officer, 1600 Clifton Rd., M/S D-74, Atlanta, GA 30333, ATTN: PRA (0920-0666).

CDC 57.132, (Form), Rev 5, 1.1

Complete a Surgical Site Infection (SSI) form for each patient found to have an SSI using the definitions.

SSI Form – Patient Demographics

Required fields are highlighted

NHSN National Healthcare Safety Network — Page 1 of 3 — **Surgical Site Infection (SSI)** — OMB No. 0920-0666 Exp. Date: 03-31-2011

*required for saving **required for completion Facility ID: **40000**	Event #: **246810**
*Patient ID: **144141**	Social Security #:
Secondary ID:	
Patient Name. Last:	First: Middle:
*Gender: F M	*Date of Birth: **06/16/1959**
Ethnicity (Specify):	Race (Specify):
*Event Type: SSI	*Date of Event:
*NHSN Procedure Code:	ICD-9-CM Procedure Code:
*Date of Procedure:	*Outpatient: Yes No

*MDRO Infection Surveillance: ☐ Yes, this event's pathogen & location are in-plan for the MDRO/CDAD Module
☐ No, this event's pathogen & location are **not** in-plan for the MDRO/CDAD Module

*Date Admitted to Facility:	Location:

Event Details

*Specific Event:

SSI Form – Basic SSI Information

Ethnicity (Specify): | Race (Specify):
*Event Type: SSI | *Date of Event: 03/21/2008
*Date of Procedure: 02/14/2008 | *NHSN Procedure Code: CARD
ICD-9-CM Procedure Code: 35.35 *Outpatient: Yes No | *MDRO Infection: Yes No
*Date Admitted to Facility: 02/12/2008 | Location: CTICU

Event Type: SSI

Date of Event: Required. The date the signs or symptoms appeared or date the diagnosing specimen was collected, whichever came first.

SSI Form– Basic SSI Information

Ethnicity (Specify): | Race (Specify):
*Event Type: SSI | *Date of Event: 03/21/2008
*Date of Procedure: 02/14/2008 | *NHSN Procedure Code: CARD
ICD-9-CM Procedure Code: 35.35 *Outpatient: Yes No | *MDRO Infection: Yes No
*Date Admitted to Facility: 02/12/2008 | Location: CTICU
Event Details
*Specific Event:

Date of Procedure: Required. Enter the date the operation was performed.

NHSN Procedure Code: Required. Enter the NHSN Operative Procedure Code for the operation that was performed.

Reporting SSI that are Readmitted

- Use the admission date of the surgical admission as the Date Admitted to Facility, not the readmission date
- Then the Date of Procedure and Date of Event will be in the correct sequence

Date Admitted to Facility ≤ Date of Procedure < Date of Event

SSI Form – Basic SSI Information

ICD-9-CM Code: Optional.

Outpatient: Required. Was the patient date of admission and date of discharge the same calendar date?

Ethnicity (Spec | Race (Sp
*Event Type: SSI | *Date of Eve 1/2008
*Date of Procedure: 02/14/2008 | *NHSN Procedu Code: CARD
ICD-9-CM Procedure Code: 35.35 | *Outpatient: Yes No | *MDRO Infection: Yes No
*Date Admitted to Facility: 02/12/2008 | Location: CTICU
Event Details
*Specific Event:

Some procedures are only allowed as inpatients (e.g., solid organ transplants, open heart procedures, etc.)

SSI Form – MDRO Infection

*MDRO Infection Surveillance: ☒ Yes, this event's pathogen & location are in-plan for the MDRO/CDAD Module

☐ No, this event's pathogen & location are **not** in-plan for the MDRO/CDAD Module

*Date Admitted to Facility: 04/24/2009 Location: SICU

MDRO Infection:
Required.
If this SSI is an NHSN-defined MDRO infection that you are monitoring in your Monthly Reporting Plan, select Yes.

SSI Form – Basic SSI Information

Enter the date the patient was admitted to the hospital when the operation was performed (not the date of readmission) and the location where the patient was housed after leaving the OR / PACU.

Ethnicity (Specify): Race (S

*Event Type: SSI *Da 08/21/2008

*Date of Procedure: 0 08 *NHSN re Code: CARD

ICD-9-CM Procedure Code 5.35 *Outpatient: Yes No *MDRO Infection: Yes No

*Date Admitted to Facility: 02/12/2008 Location: CTICU

Event Details

*Specific Event:

Note: Location is an optional field for SSI!

Note: This is <u>never</u> a location or admission date associated with a readmission or a place where the patient may be after discharge (e.g., nursing home).

SSI Form – Event Details

*Date Admitted to Facility: | Location:

Event Details

*Specific Event:

☐ Superficial Incisional Primary (SIP) ☒ Deep Incisional Primary (DIP)

☐ Superficial Incisional Secondary (SIS) ☐ Deep Incisional Secondary (DIS)

☐ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms | Laboratory

Specific Event: Required.
Check the box to indicate the definition that was used to identify the SSI.

SSI – Event Details

*Date Admitted to Facility: | Location:

Event Details

*Specific Event:

☐ Superficial Incisional Primary (SIP) ☐ Deep Incisional Primary (DIP)

☐ Superficial Incisional Secondary (SIS) ☐ Deep Incisional Secondary (DIS)

☒ Organ/Space (specify site): MED

*Specify Criteria Used (check all that apply):

Signs & Symptoms | Laboratory

If the specific event is Organ/Space, specify the organ/space site that was identified. See Chapter 17.

SSI – Event Details

*Specify Criteria Used (check all that apply):

Signs & Symptoms

- ☐ Purulent drainage or material
- ☒ Pain or tenderness
- ☐ Localized swelling
- ☒ Redness
- ☐ Heat
- ☐ Fever
- ☒ Incision deliberately opened by surgeon
- ☐ Wound spontaneously dehisces
- ☐ Abscess
- ☐ Hypothermia
- ☐ Apnea
- ☐ Bradycardia
- ☐ Lethargy
- ☐ Cough

Laboratory

- ☒ Positive culture
- ☐ Not cultured
- ☐ Positive blood culture
- ☐ Blood culture not done or no organisms detected in blood
- ☐ Positive Gram stain when culture is negative or not done
- ☐ Other positive laboratory tests‡
- ☐ Radiographic evidence of infection

Clinical Diagnosis

- ☐ Physician diagnosis of this event type
- Physician institutes appropriate antimicrobial therapy‡

r organ/space specific site criteria

Select the specific elements of the criterion that were used to identify this infection.

SSI – Event Details

A SSI was identified before the patient was discharged from the facility following the operation

P SSI was identified during post-discharge surveillance, including ED visit without readmission.

RF SSI was identified due to patient readmission to the facility where the operation was performed (as of 1/1/12)

RO SSI was identified due to patient admission to a facility other than where the operation was performed (as of 1/1/12)

Detected:
Required.
Check the box to indicate when/how the SSI was identified.

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ RF (Readmission to facility where procedure performed) ☐ RO (Readmission to facility other than where procedure was performed)

*Secondary Bloodstream Infection: Yes No	**Died: Yes No SSI Contributed to Death: Yes No
Discharge Date:	*Pathogens Identified: Yes No *If Yes, specify on pages 2-3.

SSI – Event Details

☐ Other Signs & Symptoms

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☒ R (Readmission)

*Secondary Bloodstream Infection: Yes No

**Died: Yes No | SSI Contributed to Death: Yes No

Discharge Date: | *Pathogens Identified: Yes No *If Yes, specify on page 2

Secondary BSI: Required.
If the patient had a culture-confirmed bloodstream infection with a documented SSI, circle Yes.

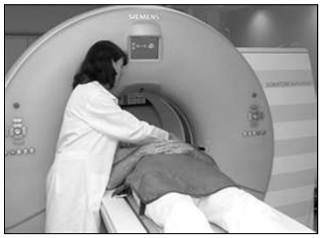
Secondary BSI

- If the criterion met for the primary infection site requires a culture, then at least one organism from that site must match exactly an organism in the blood culture (antibiograms of the isolates do not have to match).
  - Example: Patient grows *E. coli* in her deep incision and in her blood. The SSI is reported with a secondary BSI and the pathogen as *E. coli*.

http://wwwdev.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf, App 1

Secondary BSI (cont.)

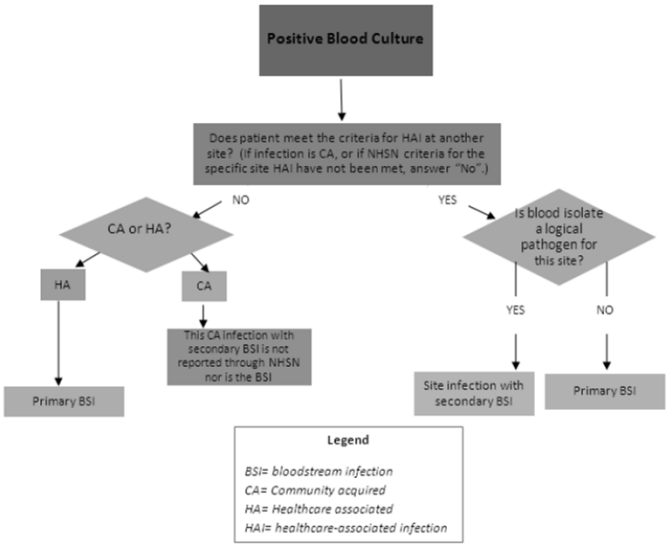
- If the criterion met for the primary infection site does <u>not</u> require a culture and the blood isolate is a logical pathogen for the site, report as secondary BSI.



Example: 6 days postoperatively, patient had fever, vomiting, and an abdominal abscess confirmed by CT scan. On the same day, his blood was drawn and grew *Bacteroides fragilis*. The infection was reported as an SSI-IAB meeting criterion 3c, with a secondary BSI. The organism was reported as *B. fragilis.*

http://wwwdev.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf, App 1

Secondary BSI Guide



http://wwwdev.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf, App 1

SSI – Event Details

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ R (Readmission)
*Secondary Bloodstream Infection: Yes No
**Died: Yes No
SSI Contributed to Death: Yes No
Discharge Date:
*Pathogens Identified: Yes No *If Yes, specify on page 2

Died:
Required for completion.
If the patient died during this hospitalization, circle Yes.

** The record may be saved without completing this field, but it will be considered incomplete.

SSI Contributed to Death:
Required only if the patient died.

If the SSI caused the death or exacerbated an existing condition which led to death, circle Yes.

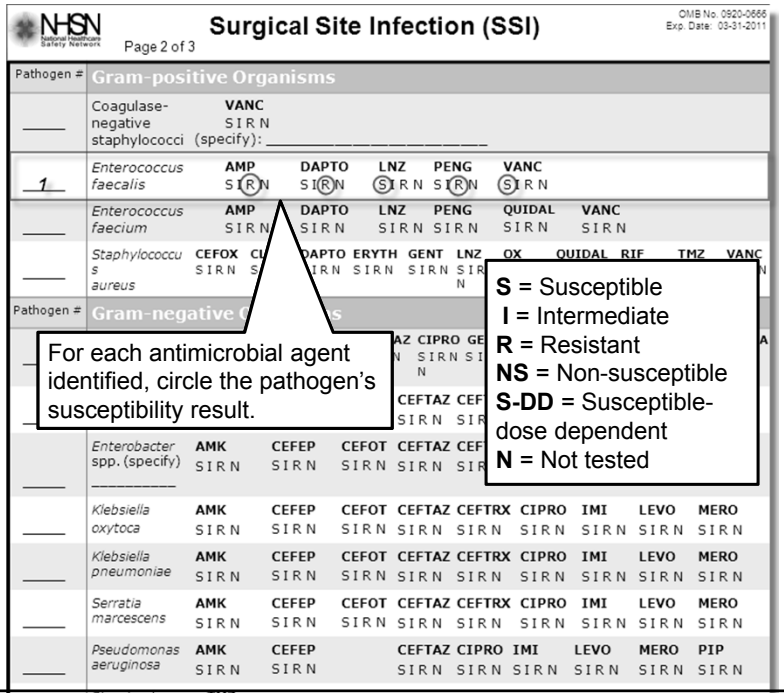
SSI – Event Details

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ R (Readmission)
*Secondary Bloodstream Infection: Yes No
**Died: Yes No
SSI Contributed to Death: Yes No
Discharge Date: *01/23/09*
*Pathogens Identified: Yes No *If Yes, specify on page 2

Discharge Date:
Optional.
The date the patient was discharged from the hospital. This is the hospitalization during which the operation was performed.

Pathogens Identified:
Required.
Circle Yes if one or more pathogens was identified.

Specific information about the pathogen is entered on the back of the form.



NHSN National Healthcare Safety Network

Surgical Site Infection (SSI)

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OMB No. 0920-0666
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Pathogen #	Gram-positive Organisms								
____	Coagulase-negative staphylococci (specify): _____	VANC S I R N							
1	*Enterococcus faecalis*	AMP S I R N	DAPTO S I R N	LNZ S I R N	PENG S I R N	VANC S I R N			
____	*Enterococcus faecium*	AMP S I R N	DAPTO S I R N	LNZ S I R N	PENG S I R N	QUIDAL S I R N	VANC S I R N		
____	*Staphylococcus aureus*	CEFOX S I R N	CL S	DAPTO I R N	ERYTH S I R N	GENT S I R N	LNZ S I R N	OX	QUIDAL RIF TMZ VANC N
Pathogen #	Gram-negative O[illegible]s								
____					AZ N	CIPRO S I R N	GE S I N		A
____					CEFTAZ S I R N	CEF S I R			
____	*Enterobacter* spp. (specify) _____	AMK S I R N	CEFEP S I R N	CEFOT S I R N	CEFTAZ S I R N	CEF S I R			
____	*Klebsiella oxytoca*	AMK S I R N	CEFEP S I R N	CEFOT S I R N	CEFTAZ S I R N	CEFTRX S I R N	CIPRO S I R N	IMI S I R N	LEVO S I R N	MERO S I R N
____	*Klebsiella pneumoniae*	AMK S I R N	CEFEP S I R N	CEFOT S I R N	CEFTAZ S I R N	CEFTRX S I R N	CIPRO S I R N	IMI S I R N	LEVO S I R N	MERO S I R N
____	*Serratia marcescens*	AMK S I R N	CEFEP S I R N	CEFOT S I R N	CEFTAZ S I R N	CEFTRX S I R N	CIPRO S I R N	IMI S I R N	LEVO S I R N	MERO S I R N
____	*Pseudomonas aeruginosa*	AMK S I R N	CEFEP S I R N		CEFTAZ S I R N	CIPRO S I R N	IMI S I R N	LEVO S I R N	MERO S I R N	PIP S I R N

For each antimicrobial agent identified, circle the pathogen's susceptibility result.

S = Susceptible
I = Intermediate
R = Resistant
NS = Non-susceptible
S-DD = Susceptible-dose dependent
N = Not tested

Summary

NHSN National Healthcare Safety Network

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Surgical Site Infection (SSI)

Page 1 of 4

*Required for saving **required for completion

Facility ID: | Event #:
*Patient ID: | Social Security #:
Secondary ID: | Medicare #:
Patient Name, Last: | First: | Middle:
*Gender: F M Other | *Date of Birth:
Ethnicity (Specify): | Race (Specify):
*Event Type: SSI | *Date of Event:
*NHSN Procedure Code: | ICD-9-CM Procedure Code:
*Date of Procedure: | *Outpatient Procedure: Yes No
*MDRO Infection Surveillance:
☐ Yes, this infection's pathogen & location are in-plan for Infection Surveillance in the MDRO/CDI Module
☐ No, this infection's pathogen & location are **not** in-plan for Infection Surveillance in the MDRO/CDI Module
*Date Admitted to Facility | Location

Event Details

*Specific Event:
☐ Superficial Incisional Primary (SIP) | ☐ Deep Incisional Primary (DIP)
☐ Superficial Incisional Secondary (SIS) | ☐ Deep Incisional Secondary (DIS)
☐ Organ/Space (specify site): _____

*Specify Criteria Used (check all that apply):

Signs & Symptoms
☐ Purulent drainage or material
☐ Pain or tenderness
☐ Localized swelling
☐ Redness
☐ Heat
☐ Fever
☐ Incision deliberately opened by surgeon
☐ Wound spontaneously dehisces
☐ Abscess
☐ Hypothermia
☐ Apnea
☐ Bradycardia
☐ Lethargy
☐ Cough
☐ Nausea
☐ Vomiting
☐ Dysuria
☐ Other evidence of infection found on direct exam, during invasive procedure, or by diagnostic tests‡
☐ Other signs & symptoms‡

Laboratory
☐ Positive culture
☐ Not cultured
☐ Positive blood culture
☐ Blood culture not done or no organisms detected in blood
☐ Positive Gram stain when culture is negative or not done
☐ Other positive laboratory tests‡
☐ Imaging test evidence of infection

Clinical Diagnosis
☐ Physician diagnosis of this event type
☐ Physician institutes appropriate antimicrobial therapy‡

‡per organ/space specific site criteria

*Detected: ☐ A (During admission) ☐ P (Post-discharge surveillance) ☐ RF (Readmission to facility where procedure performed)
☐ RO (Readmission to facility other than where procedure was performed)
*Secondary Bloodstream Infection: Yes No | **Died: Yes No | SSI Contributed to Death: Yes No
Discharge Date: | *Pathogens Identified: Yes No *If Yes, specify on pages 2-3.

Assurance of Confidentiality: The voluntarily provided information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will only be used for the purposes stated in this request and will not be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 308 and 306(d) of the Public Health Service Act (42 USC 242b, 242d, and 242m(d)).
Public reporting burden of this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC Reports Clearance Officer, 1600 Clifton Rd., MS D-74, Atlanta, GA 30333, ATTN: PRA (0920-0666).
CDC 57.102 (Form, Rev.3, 01/11)

- Complete and enter or import *Surgical Site Infection* records for the procedures that are selected for surveillance.
- Use the SSI Protocol, Tables of Instructions, Infection Site Definitions chapters of the Patient Safety Manual for guidance.

Analysis and Reports

NHSN Home
Reporting Plan
Patient
Event
Procedure
Summary Data
Import/Export
Analysis
- Generate Data Sets ← 1
- Output Options ← 2
- Statistics Calculator

Surveys
Users
Facility
Group
Log Out

Logged into Medical Center East (ID 10000) as TCH.
Facility Medical Center East (ID 10000) is following the PS component.

1

Generate Data Sets

Data sets are being generated, Please Wait....

PSVacc_Events

The data set generation process will take several minutes. Do not logoff or close this window while the process is running. You may minimize the browser window and work in other applications while you wait.

Logged into Medical Center East (ID 10000) as TCH.
Facility Medical Center East (ID 10000) is following the PS component.

2

Patient Safety Component
Analysis Output Options

Expand All | Collapse All

- Device-Associated Module
- Procedure-Associated Module ← 3
- MDRO/CDI Module - Infection Surveillance
- MDRO/CDI Module - LABID Event Reporting
- MDRO/CDI Module - Process Measures
- MDRO/CDI Module - Outcome Measures
- Vaccination Module
- Advanced
- My Custom Output
- Published Output

Patient Safety Component
Analysis Output Options

Expand All | Collapse All

- Device-Associated Module
- Procedure-Associated Module
  - All Procedure-Associated Events
  - SSI ← 4
    - CDC Defined Output ← 5

Line Listing - All SSI Events	Run	Modify
Frequency Table - All SSI Events	Run	Modify
Bar Chart - All SSI Events	Run	Modify
Pie Chart - All SSI Events	Run	Modify
SIR - Complex AR SSI Data by Procedure	Run	Modify
SIR - Complex AR SSI Data by Surgeon	Run	Modify
SIR - In-plan Complex AR SSI data by Procedure	Run	Modify
SIR - In-plan Complex AR SSI data by Surgeon	Run	Modify
SIR - All SSI Data by Procedure	Run	Modify
SIR - All SSI Data by Surgeon	Run	Modify
SIR - In-plan All SSI Data by Procedure	Run	Modify
SIR - In-plan All SSI data by Surgeon	Run	Modify
Line Listing - Incomplete Procedures for SSI SIR	Run	Modify

SSI Line List

National Healthcare Safety Network

Line Listing for All Surgical Site Infection Events

As of: December 28, 2008 at 5:56 PM

Date Range: SSI_EVENTS procDate 09/01/2008 to 12/21/2008

Org ID	Patient ID	Date of Birth	Gender	Admission Date	Event ID	Event Date	Event Type	Specific Event	Procedure Date	Procedure Code
10036	01-001-*2314	08/06/1950	F	09/16/2008	1254978	09/22/2008				
10036	1108-021	11/17/1950	F	11/11/2008	1517853	12/04/2008				
10036	0908-013	06/03/1954	F	09/15/2008	1517854	09/21/2008				
10036	0908-004	02/12/1987	F	09/09/2008	1517855	09/24/2008				
10036	1008-010	08/14/1941	F	10/11/2008	1517856	10/16/2008				

Frequency Table

Frequency
Percent
Row Pct
Col Pct

Table of procCode by spcEvent

procCode	spcEvent DIP	spcEvent EMET	spcEvent SIP	Total
CHOL	2 40.00 100.00 66.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 40.00
CSEC	0 0.00 0.00 0.00	1 20.00 100.00 100.00	0 0.00 0.00 0.00	1 20.00
HPRO	1 20.00 50.00 33.33	0 0.00 0.00 0.00	1 20.00 50.00 100.00	2 40.00
Total	3 60.00	1 20.00	1 20.00	5 100.00

Standardized Infection Ratio (SIR)

SIR = Number of observed infections (O) divided by the number of expected infections (E)

$$SIR = \frac{O}{E}$$

SIR

- A summary measure used to track HAIs at a national, state, other group, or local level over time
- Adjusts for patients of varying risk within each facility
- SIR compares the actual number of HAIs reported with the baseline U.S. experience (i.e., NHSN aggregate data are used as the standard population)
- An SIR >1.0 indicates that more HAIs were observed than predicted

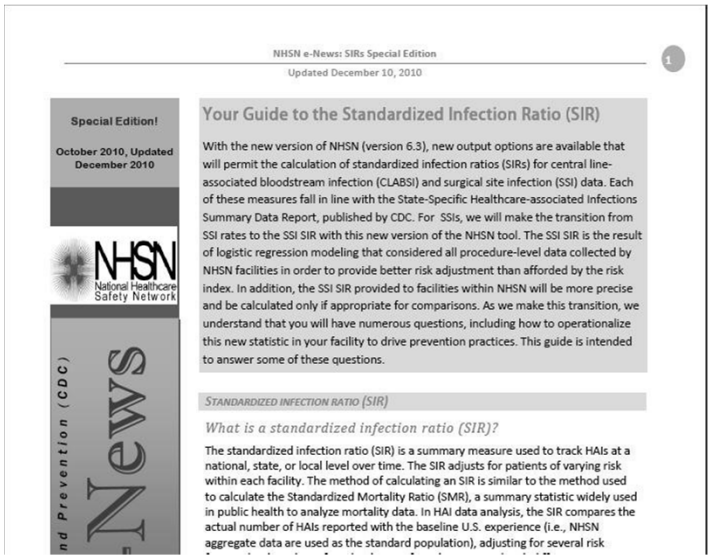
SSI SIR

- Allows for all available risk factors to be considered
- Each factor's "weight" varies according to its significant contribution to the risk of SSI for the procedure
- For all NHSN procedures, the models predicted SSI risk better than the basic risk index

Calculating E for SSI SIRs

- Using the parameter estimates from the logistic regression models, the probability of SSI for each patient is calculated and these are summed across patients to yield the expected number of SSIs (E).
- This is done for you in the NHSN analysis tool!
- See special edition of newsletter for details:

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf



NHSN e-News: SIRs Special Edition

Updated December 10, 2010

1

Special Edition!

October 2010, Updated December 2010

NHSN National Healthcare Safety Network

nd Prevention (CDC)

News

Your Guide to the Standardized Infection Ratio (SIR)

With the new version of NHSN (version 6.3), new output options are available that will permit the calculation of standardized infection ratios (SIRs) for central line-associated bloodstream infection (CLABSI) and surgical site infection (SSI) data. Each of these measures fall in line with the State-Specific Healthcare-associated Infections Summary Data Report, published by CDC. For SSIs, we will make the transition from SSI rates to the SSI SIR with this new version of the NHSN tool. The SSI SIR is the result of logistic regression modeling that considered all procedure-level data collected by NHSN facilities in order to provide better risk adjustment than afforded by the risk index. In addition, the SSI SIR provided to facilities within NHSN will be more precise and be calculated only if appropriate for comparisons. As we make this transition, we understand that you will have numerous questions, including how to operationalize this new statistic in your facility to drive prevention practices. This guide is intended to answer some of these questions.

STANDARDIZED INFECTION RATIO (SIR)

What is a standardized infection ratio (SIR)?

The standardized infection ratio (SIR) is a summary measure used to track HAIs at a national, state, or local level over time. The SIR adjusts for patients of varying risk within each facility. The method of calculating an SIR is similar to the method used to calculate the Standardized Mortality Ratio (SMR), a summary statistic widely used in public health to analyze mortality data. In HAI data analysis, the SIR compares the actual number of HAIs reported with the baseline U.S. experience (i.e., NHSN aggregate data are used as the standard population), adjusting for several risk

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf

Predictive Risk Factors

NHSN Operative Procedure	Risk Factor(s) – All SSIs
AAA	Duration
CBGB/C	Age, ASA, duration, gender, number of beds*
COLO	Age, anesthesia, ASA, duration, endoscope, medical school affiliation*, number of beds*, wound class
FUSN	Approach, ASA, diabetes, duration, medical school affiliation*, spinal level, trauma, wound class
HPRO	Age, anesthesia, ASA, duration, HPRO type, number of beds* trauma
HYST	Age, anesthesia, ASA, duration, endoscope, number of beds*
KPRO	Age, anesthesia, ASA, duration, gender, KPRO type, number of beds*, trauma
LAM	Anesthesia, ASA, duration, endoscope
PVBY	Age, ASA, duration, gender, medical school affiliation*
RFUSN	Approach, diabetes, duration
VSHN	Age, medical school affiliation*,number of beds*, wound class

*Risk factors from Patient Safety Annual Facility Survey

Mu Y, et al. ICHE 2011;32(10):970-986

SSI SIR Options in NHSN

All SSI SIR Model	• Includes superficial, deep and organ/space • Superficial and deep SSIs limited to primary incisions only • Includes SSIs identified on admission, readmission and via post-discharge surveillance
Complex A/R SSI Model	• Includes <u>only</u> SSIs identified on admission/readmission to facility where procedure was performed • Includes <u>only</u> inpatient procedures • Includes <u>only</u> deep incisional primary and organ/space SSIs
Complex 30-day SSI model (used for CMS IPPS)	• Includes only in-plan, inpatient COLO and HYST procedures in patients ≥18 years of age • Includes only deep incisional primary and organ/space SSIs with an event date within 30 days of the procedure • Uses only age and ASA to determine risk

Overall SSI SIR

Org ID	Summary Yr	Procedure Count	infCountAll	All SSI Model Number Expected	All SSI Model SIR	All SSI Model SIR p-value	All SSI Model 95% Confidence Interval
10018	2009	524	13	6.687	1.94	0.0196	1.150, 3.091

- **During 2009, there were 524 procedures performed and 13 SSIs identified.**
- **Based on the NHSN 2006-2008 baseline data, 6.687 SSIs were expected.**
- **This results in an SIR of 1.94 (13/6.687), signifying that during this time period this facility identified 94% more SSIs than expected.**
- **The p-value and 95% Confidence Interval indicate that the number of observed SSIs is significantly higher than the number of expected SSIs.**

SSI Rates

- Go to Advanced Output Options
- No comparative statistics

Please place tab here with the number and title 11. Internal Validation. Presentation should be double sided, black and white, and 2 slides per page.

Internal NHSN Data Validation for Improved Surveillance and Prevention

NHSN Training
October 3, 2012
Katie Arnold MD

Acknowledgments: Surveillance Branch, DHQP

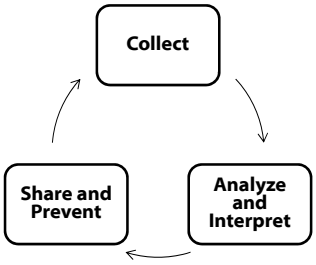
Division of Healthcare Quality Promotion

Objectives

- **Describe**
  - Attributes of high quality HAI surveillance
  - How internal validation can help you achieve it
  - Why it matters
- **Consider**
  - Elements of internal data validation
- **Recommend**
  - Ways facilities can validate their own CLABSI and SSI data

HAI Surveillance is

Ongoing, systematic collection, analysis, interpretation, and communication of data essential to planning and implementing prevention



Quality surveillance for Healthcare-Associated Infections (HAI) Requires:

- **CONSISTENCY -> COMPLETENESS**

Consistency - > Completeness

- **In the era before public reporting and payment schemes, surveillance had to be consistent and <u>relatively</u> complete**
- **New paradigm: Complete surveillance is the standard for all facilities**
  - Otherwise, harder-working facilities could suffer
  - The public and external validators will judge by this standard

How Can You Achieve Completeness ?

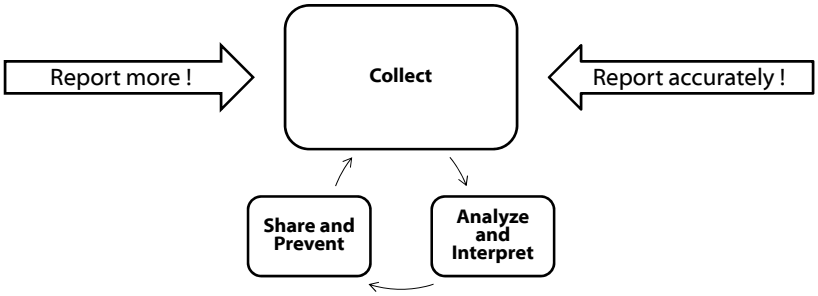
- **Review** of a minimum clinical data set for all candidates**

	Recommended Step 1	Step 2
CLABSI	Review every positive blood culture**	Review for presence of a central line
SSI	Identify and review all post-op** patients and hospital re-admissions: 2012→ 30d or 1y 2013→ 30d or 90d	• Daily hospital rounds important to identify infections not resulting in cultures • Review wound cultures but realize that culture-based surveillance alone misses 50-60% of SSI
CAUTI	Review every positive urine culture**	Review for presence of a urinary catheter
labID event FacWideIN	Review all final test results for specific events** (e.g. MRSA blood cultures, C. difficile tests)	Assess if ER positives were admitted

- **Review events up to the point where HAI is ruled out, (at minimum) for CLABSI and CAUTI surveillance locations, surgical procedures under surveillance, labID events under surveillance

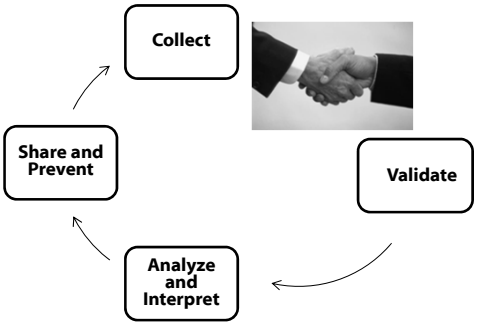
Increasing Pressure on Collection:
More required reporting
Data must be accurate
Money is on the line

IP cannot go it alone



HAI Validation Provides

- Insights into systematic weaknesses (and how to correct them)
- Assurance that surveillance data are of high quality:
  Complete, accurate, and timely
- Validation engages a team



Quality Surveillance for Healthcare-Associated Infections (HAI) Requires:

- **CONSISTENCY -> COMPLETENESS**
- **COORDINATION**

Coordination of Support for IPs

- **IP and Quality cannot do complete surveillance/ validation alone**
- **HAI surveillance /validation needs to be a shared responsibility across hospital units, services and disciplines**
- **IP needs protected time for prevention activities;**
  - Delegation of certain tasks, e.g. denominator collection, data entry
  - Widespread and ongoing collection of patient denominator data may require data system/ IT solutions
  - As facilities achieve more connection of relevant clinical data (e.g. new antimicrobial starts), surveillance may further improve

Who Can Support IP?

	Recommended Step 1	Partner	Step 2	Partner
CLABSI	Review every positive blood culture**	• Micro lab LIS	Review for presence of a central line	• Location-specific denominator counters, CL investigators • IT to tweak electronic down loads
SSI	Identify and review all post-op** patients and hospital re-admissions 2012→ 30d or 1y 2013→ 30d or 90d	• Bed control /ADT system • Medical records • Surgery staff	• Daily hospital rounds important to identify infections not resulting in cultures • Review wound cultures but realize that culture-based surveillance alone misses 50-60% of SSI	• Micro lab LIS • Surgical ward staff • OR: Return to surgery Consider: • Pharmacy • MR: extended LOS • MR: ICD-9 d/c coding
All	IP has final call, using NHSN definitions	• Clerical help (data entry/ tracking)		

Internal validation engages partners in supporting surveillance data quality

- **at least for surveillance locations, surgical procedures under surveillance, labID events under surveillance

Quality Surveillance for Healthcare-Associated Infections (HAI) Requires:

- ❑ **CONSISTENCY -> COMPLETENESS**
- ❑ **COORDINATION**
- ❑ **CONFIDENCE**

Courtesy of Lynn Janssen, CA DPH

Confidence in Your Data

- **Facilities will be held accountable for using NHSN methods and definitions**

- **Team must know the NHSN surveillance definitions**
- **Apply definitions with confidence the same way every time**
- **Seek assistance for ambiguity**

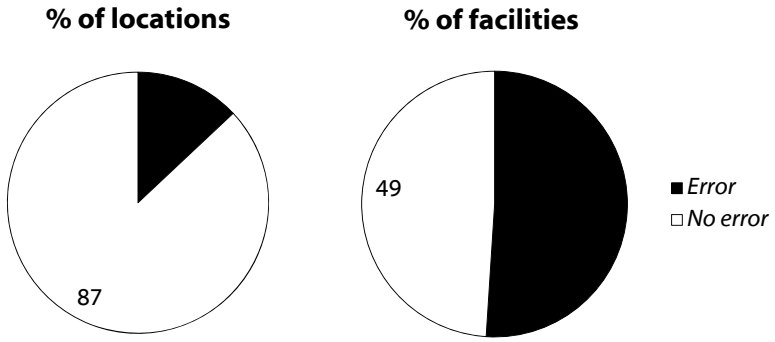
Validation Can Help Each of These

- **COMPLETENESS:**
  - by double checking sources and investigating ALL candidate events until ruled out
- **COORDINATION:**
  - Focusing facility systems on developing tools to support surveillance and validation
    - E.g. line list of positive blood cultures from LIS
    - E.g. systems for alerts upon return trips to OR, surgical readmissions
- **CONFIDENCE:**
  - in your data through team training
  - In a level playing field for all facilities

Why Validate?

- **These are YOUR data**
  - Good data help you derive meaningful, actionable information for your facility
- **Ability to hold up under external scrutiny (e.g. CMS)**
  - Incomplete or inaccurate surveillance may affect payment and/or reputation
- **You may be surprised at what you find**

Mapping Errors Found by NHSN Validation, CA



CA DPH 2012

Denominator Errors Found by NHSN Validation

- **Central line counting problems**
  - Central line-counters who don't know or follow correct definitions and methods
  - Electronic upload of line data that mis-counts
- **Incomplete surgical procedures based on source limitations**
  - Add-on procedures omitted from OR schedule
  - Omitted ICD-9 procedure code during electronic upload
- **Excess NHSN procedures due to inclusion of wounds not primarily closed**
  - A common problem that may resolve with new 2013 definitions

Numerator Errors Found by NHSN Validation

- **Omissions and Misconceptions**
  - Blood cultures were sometimes "just missed"
  - MRSA BSI was not POA just because MRSA colonization was found on active surveillance testing
  - Candida BSI was not secondary to PNEU unless patient met PNEU3 definition
  - Use of current weight vs. birth weight in NICUs
  - Primary vs. secondary BSI issues commonly a challenge

Suggestions for Internal Data Validation

- **~Annually**
  - Draft surveillance / validation plans
  - Recruit partners and update staff training
  - Review annual survey for facility descriptors, mapping
- **~Monthly**
  - Report CLABSI denominators, SSI Procedure Import
  - Run analysis checks for missing, inconsistent or duplicate data
  - Communicate with partners
- **~Daily:**
  - Spot check processes
    - denominator tracking (e.g.: central line days)
    - Surgical procedure documentation
  - Active case-identification
    - Walk-the-walk: micro lab, surgical wards, ICUs

Recommended Annual Check: Pull up Annual Survey and the NHSN Manual

- **Error-prone facility-level information in NHSN**
  - Medical school affiliation
  - Number of beds (ICU, specialty care areas, wards)
  - Location mapping
    - With CMS addition of labID event, facility mapping needed house-wide
    - CA suggested working with bed control or CNO to map correctly
- **Are reporters up to date on protocol standards?**
  - Gather your group (facility, or APIC Chapter)
    - Review NHSN newsletter updates
    - Organize a webinar or training update
    - Work through case-studies from AJIC

Annual Check: For Manual CLABSI Denominators

- **Protocol: manual count, same time each day**
  - **Are you confident that staff are counting correctly?**
    - What is definition of a central line? Which lines do they count?
    - Quiz them, or conduct a spot check with each location
    - What happens when they go on vacation?
  - **Missing or implausible data?**
    - # patient days > # beds
    - # central line days > # patient days
    - **Using logs, calculate % of days per year that**
      - Patient days not collected
      - Central line days not collected
  - **Involve and review results with staff**
    - A source of pride !

Annual Check: Electronic CLABSI Denominators

- **Electronic denominators commonly inflated**
  - Protocol: one central-line day per patient
  - Electronic count for patient with 3 lines may be 3 line-days
- **Before you begin: validate e-denominators with concurrent manual counts x 3 months**
  - Counts should match within 5%
  - Work with IT to correct electronic counting problems, or hand count
- **Current users: spot check at least one unit per month**
  - **Determine % of days per year that**
    - Patient days not collected
    - Central line days not collected
    - # patient days > # beds
    - # central line days > # patient days

Annual Check: SSI Denominators (Procedures)

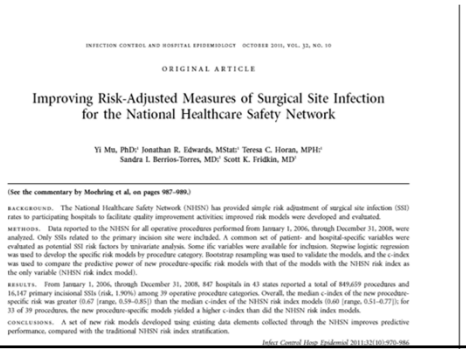
- **Whether manual or imported, are denominators complete?**
- **Missing denominators will make you look bad**
  - Consider quality of chosen denominator data sources: OR log, OR schedule, ICD-9 for repeat procedures or high risk ICD-9 CM diagnoses at d/c, EMR filter
  - Consider checking a second source to look for missing procedure data
- **How do you identify and remove procedures not primarily closed, or multiple NHSN procedures?**
  - Chart review, op report review
  - Your edits needed to correct for these
  - **Proposed revisions to SSI surveillance may reduce this burden**

Annual Check: SSI Denominators (Procedures)

- **Especially for facilities with lots of surgery: use electronic denominator import**
  - SSI "Procedure import via .csv": Step-by-step instructions, available in NHSN Help
  - Work closely with OR and IT staff make this work
  - Validate results to assure coding has not omitted ICD-9 categories

Check SSI Denominator Data Quality in Analysis

- **Consider which variables you want to validate**
  - Variables you care about:
    - E.g.: Surgeons, emergency, ASA, wound class, procedure duration
  - (Revised) variables used for NHSN risk adjustment
    - Listed by procedure in Appendix A of the National HAI Standardized Infection Ratio (SIR) Report, January-December 2010 http://www.cdc.gov/hai/pdfs/SIR/national-SIR-Report_03_29_2012.pdf
  - Variables shared with CMS



INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2011, VOL. 32, NO. 10

ORIGINAL ARTICLE

Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network

Yi Mu, PhD[1] Jonathan R. Edwards, MStat[1] Teresa C. Horan, MPH[1] Sandra I. Berrios-Torres, MD[1] Scott K. Fridkin, MD[1]

(See the commentary by Moehring et al, on pages 987–989.)

BACKGROUND. The National Healthcare Safety Network (NHSN) has provided simple risk adjustment of surgical site infection (SSI) rates to participating hospitals to facilitate quality improvement activities; improved risk models were developed and evaluated.

METHODS. Data reported to the NHSN for all operative procedures performed from January 1, 2006, through December 31, 2008, were analyzed. Only SSIs related to the primary incision site were included. A common set of patient- and hospital-specific variables were evaluated as potential SSI risk factors by univariate analysis. Some ific variables were available for inclusion. Stepwise logistic regression was used to develop the specific risk models by procedure category. Bootstrap resampling was used to validate the models, and the c-index was used to compare the predictive power of new procedure-specific risk models with that of the models with the NHSN risk index as the only variable (NHSN risk index model).

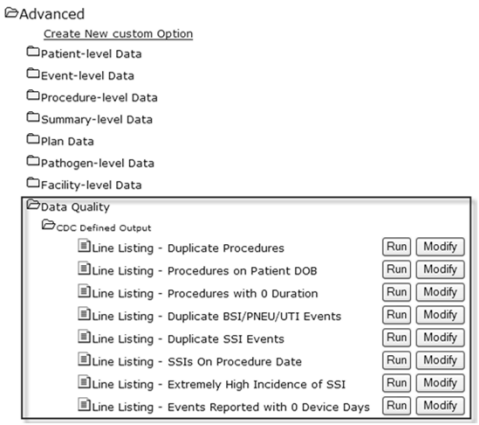
RESULTS. From January 1, 2006, through December 31, 2008, 847 hospitals in 43 states reported a total of 849,659 procedures and 16,147 primary incisional SSIs (risk, 1.90%) among 39 operative procedure categories. Overall, the median c-index of the new procedure-specific risk was greater (0.67 [range, 0.59–0.85]) than the median c-index of the NHSN risk index models (0.60 [range, 0.51–0.77]); for 33 of 39 procedures, the new procedure-specific models yielded a higher c-index than did the NHSN risk index models.

CONCLUSIONS. A set of new risk models developed using existing data elements collected through the NHSN improves predictive performance, compared with the traditional NHSN risk index stratification.

Infect Control Hosp Epidemiol 2011;32(10):970–986

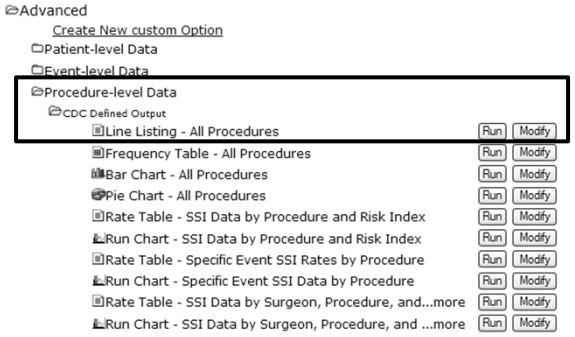
NHSN Monthly Analysis: "Canned" but Modifiable Data Quality Output Options :

- **Analysis**
- **(Generate datasets)**
- **Output options**
- **Advanced**
- **Data Quality**
  - CDC-defined output



Example: Denominator Quality Validation
Check procedure duration and ASA Score for all CBGB and CBGC procedures

- Do monthly, after procedure upload
- Analysis
- (Generate datasets)
- Output options
- Advanced
- Procedure-level Data
- CDC-defined output
- Line-listing – All Procedures
- Modify button



Checking CBGB Data: Procedure Duration

National Healthcare Safety Network

Line Listing for All Procedures

As of: September 22, 2010 at 2:58 PM

Date Range: All PROCEDURES

Org ID	Patient ID	Date of Birth	Gender	Procedure ID	Procedure Date	Procedure Code	Duration of Procedure - hr	Duration of Procedure - min
10018	829204	10/20/1925	F	21790	07/27/2009	CBGB	1	6
10018	250754	08/23/1941	M	21664	07/31/2009	CBGB	1	42
10018	789995	08/05/1925	F	21750	08/13/2009	CBGB	1	47
10018	814096	02/12/1931	M	21766	07/23/2009	CBGB	1	51
10018	838249	03/20/1930	M	21873	07/02/2009	CBGB	1	55
10018	838231	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	0
10018	527318	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	7
10018	836570	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	12
10018	739259	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	15
10018	744782	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	15

Notice that all CBGB procedure durations are <3hours; suggests that incorrect duration was imported for these procedures.

Checking CBGB/CBGC Data: ASA Score

National Healthcare Safety Network
Frequency Table for All Procedures
As of: September 22, 2010 at 3:15 PM
Date Range: All PROCEDURES

Frequency
Col Pct

Table of asa by proccode

asa	proccode CBGB	proccode CBGC	Total
2	1 1.75	0 0.00	1
3	1 1.75	0 0.00	1
4	26 [illegible]	1 [illegible]	27
5	29 50.88	0 0.00	29
Total	57	1	[illegible]

ASA Score of 5 = Moribund patient who is not expected to survive for 24 hours with or without the operation.

It is unlikely that 50% of the patients undergoing CBGB would be classified as a 5.

Troubleshooting

- **Consider sources of data & possible sources of problem**
- **Perform data checks monthly**
  - Especially after any changes in source database(s) and/or NHSN protocol
- **Discuss issues with OR staff, IT staff, and/or data manager**
  - Has IT glitch changed data capture?
  - Has code omitted procedures?
  - Have default values been used in the absence of available or electronically captured variables?

Numerators: CLABSI

- **More problems with under-reporting than over-reporting CLABSIs**
- **Some facilities "just miss" positive blood cultures**
- **One way to be sure you haven't missed any CLABSIs is to track and double check all positive blood cultures in surveillance locations**
- **During surveillance, stop when you can rule-out HAI**
  - Screening questions: Is this a known infection? Was the patient in a surveillance location (or recently discharged)? Was there a central line (or recently pulled)?
  - Documentation may help you during external validation
- **Validation of case-ascertainment should include periodically reviewing list of candidate cases**
  - Micro lab should be able to produce list of positive blood cultures for surveillance areas
  - If candidate cases were "missed," investigate why and how to fix it

New this Fall: Analysis Quick Reference Guides

- **Line list**
- **Pie chart**
- **Frequency Table or SIR Table (DA vs. SSI)**
- **Run chart (control chart) showing change over time**
- **How to filter data by time period or other criteria**
- **Rate table or SIR report by the fiscal year**
- **How to export NHSN data**
- **How to run analyses with custom (self-defined) fields, and save output template for future use**
- **How to run multiple reports at once**

E.g. Run Charts: Longitudinal Data Checks

- **Review longitudinal trends and assess aberrations**
  - Numerators by location and overall
  - Denominators by location and overall
  - Rates by location and overall
  - Benchmarked rates (SIR) by location and overall

Now What?

- **Use YOUR Valid Data**
  - Consider weaknesses identified by validation, how to improve
  - Consider the increasingly valid results to direct prevention efforts
    - What's good and improving
    - What's bad or falling behind
  - Discuss your validated results with hospital epidemiologist and/or infection control committee chair, and strategize for next steps
  - Show your validated results to partners
  - Show your validated results to C-suite
    - How many cases has your facility prevented?
    - How much money have you saved?
    - Can you explain methods to The Joint Commission?
    - Can you can stand up to a CMS audit?

Please place tab here with the number and title 12. SSI Case Studies: Audience Response. Presentation should be double sided, black and white, and 2 slides per page.

Surgical Site Infection (SSI) Case Studies

Teresa Horan, MPH
Gloria C. Morrell, RN, MSN, CIC
October 3, 2012

Case 1

- A patient had bilateral knee prostheses (KPRO) implanted during a single trip to the OR.
  - Left KPRO incision at 0823 and closed at 0950
  - Right KPRO incision at 1003 and closed at 1133

Which statement is true?

1. One KPRO procedure should be reported with a combined duration of 2 hrs 57 min.
2. Two separate KPRO procedures should be reported, each with a duration of 2 hrs 57 min.
3. Two separate KPRO procedures should be reported: L KPRO with a duration of 1 hr 27 min and R KPRO with a duration of 1 hr 30 min

Case 2

- 6/18: 45-year-old male had a colon resection (COLO)
  6/22:
  - Patient's abdominal incision has purulent drainage from subcutaneous tissue and slight erythema and induration; incision is intact
  - Wound drainage specimen to lab for culture (6/24: Grew *Enterobacter* spp and *E. coli*)
  - Patient started on antibiotics

What should be reported to NHSN?

1. Nothing. The surgeon did not open the wound, so the criteria are not met.
2. Nothing. It is an SSI, but not an HAI.
3. SSI – SIP
4. SSI – DIP

Case 3

- Patient is admitted to the hospital on 04/12 for elective surgery and active MRSA screening test is positive.
- On the same day, patient undergoes total abdominal hysterectomy (HYST).
- Postoperative course is unremarkable; patient discharged on 4/16.
- On 4/29, patient is readmitted with complaints of acute incisional pain since day before. Surgeon opened the wound into the fascial level and sent drainage specimen for culture and sensitivities.
- On 5/1, culture results are positive for MRSA.

Is this an HAI?

1. Yes
2. No

What infection should be reported?

1. SSI-SIP
2. SSI-SIS
3. SSI-DIP
4. SSI-DIS
5. SSI-IAB

Case 3

If so, what is the date of event?

Case 4

- Patient has a total hip arthroplasty (HPRO) performed on 03/17 at Hospital A.
- Discharged from Hospital A on 3/19.
- Admitted to Hospital B on 3/25 with purulent drainage from the superficial incision.
- Further investigation concludes this is a superficial incisional SSI.

What should Hospital B do?

What should Hospital A do?

What if the infection became apparent 35 days after the procedure?

Case 5

- Patient admitted on 9/10 and underwent a hemi-colectomy. Wound class = 2.
- 9/13: Temp up to 38.7°C, abdominal pain. Ultrasonography shows abscess along the abdominal wall.
- 9/14: I&D of the abdominal wall abscess. Abscess specimen collected for culture. Antibiotics begun.
- 9/18: Discharged from hospital on oral antibiotics. Abscess culture positive for *E. coli*.

What type of SSI does this patient have?

1. SSI-SIP
2. SSI-DIP
3. SSI-IAB
4. SSI-GIT

Case 6

- 1/22: Patient had an abdominal hysterectomy (HYST)
- 2/1: Pelvic pain; Temp 38.4 C
- 2/2: MRI reveals abscess in the deep pelvic tissue
- 2/3: Surgeon opened wound in the OR and drained abscess; specimen to lab for culture; notes ‘infected hematoma”; antibiotics begun
- 2/5: Culture positive for *Pseudomonas aeruginosa*

What should be reported?

1. SSI – IAB
2. SSI – OREP
3. SSI - EMET

Case 7

- Day 1: HPRO performed. Patient screened for MRSA upon admission to ICU per protocol.
- Day 2: Patient is very confused. Temperature normal. Wound condition good.
- Day 3: Results of the admission screening cultures of the nose and groin are positive for MRSA. The following entry is found in the chart: “Patient removed the dressing several times. Recurrent confused condition. Wound edges very red and taut.”

Case 7

- Day 5: Entry in the chart: “Wound abscess lanced by the attending surgeon”. A wound specimen sent to lab for culture. Antibiotics begun.
- Day 7: Wound culture: MRSA
- Day 9: Improvement in wound condition. Discharged to Rehabilitation Center.

Case 7

- Does this patient have an SSI?
- What type?
- What is the date of the infection?

Case 8

A patient has a 2-vessel CABG performed using a saphenous vein, which was harvested via laparoscope, and an internal mammary artery. The ICD-9-CM procedure codes assigned by a Medical Records coder were 36.12 (CBGB) and 36.15 (CBGC).

What NHSN operative procedure code(s) should be entered into NHSN?

Case 8

- Should you report that endoscope use was Yes or No?

Case 8

- If the patient develops both a leg donor site superficial incisional infection and a chest superficial incisional infection, do you count two infections or only one?
- If only one, which one?

Case 9

On 5/15 a 45-year-old female undergoes an abdominal hysterectomy (HYST) and colectomy (COLO) performed through the same incision.

If both of these procedures are in your Monthly Reporting Plan in May, which one(s) do you enter into NHSN?

Case 9

How are the durations for the individual procedures determined?

Case 9 (cont.)

- 5/15: A 45-year-old female undergoes an abdominal hysterectomy (HYST) and colectomy (COLO) performed through the same incision.
- 5/19: Patient spikes temp to 38 C, has abdominal pain and emesis. Ultrasound shows fluid collection in abdominal cavity. Fluid specimen for culture is obtained by needle aspiration.
- 5/20: Culture positive for *E. faecium,* many neutrophils seen

Is this an HAI?

Is this an SSI?

1. SSI-Deep Incisional Primary
2. SSI-Deep Incisional Secondary
3. SSI Organ/Space, specific site IAB
4. This is an IAB but there is no SSI infection

Case 10

- 1/22: Patient had a total laparoscopic abdominal hysterectomy
- 2/1: Abdominal pain with purulent drainage in 2 of 3 trocar sites; Temp 38.4 C
- 2/3: Surgeon opened wounds in the ER and noted purulent material in the fascial layer; specimens to lab for culture; antibiotics begun
- 2/5: Cultures positive for *Pseudomonas aeruginosa*

Case 10

Is this an SSI?

What type?

A deep incisional SSI must meet one of the following criteria:

- Infection occurs within 30 or 90 days after the NHSN operative according to the list in Table 3.

and

- involves deep soft tissues of the incision (e.g., fascial and muscle layers) of the incision

and

patient has at least one of the following:

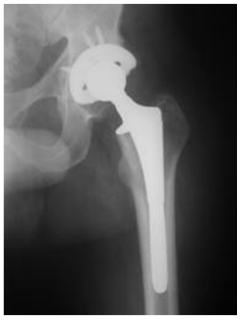
- a. purulent drainage from the deep incision
- b. a deep incision spontaneously dehisces…
- c. And abscess or other evidence of infection is found…
- d. diagnosis by surgeon or physician

SSI Chapter, Deep incisional SSI definition

How many SSIs should be reported?

1. One
2. Two
3. Three
4. Four

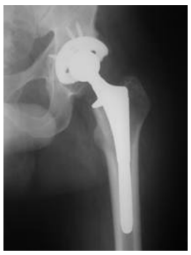
Case 11



- 78 y.o.. female had a hip prosthesis procedure (HPRO) on Feb 4.
- On June 17, she had an infected decubitus ulcer on her sacrum.
- On July 6, blood cultures grew *Staph. aureus* and she was placed on antimicrobials for treatment of the bloodstream infection.
- On July 11, she experienced pain and heat in the hip joint; radiographic evidence on gallium scan shows an abscess at the hip prosthesis site; culture of hip was no growth.

Should this be counted as an SSI?

1. Yes, this is an SSI.
2. No, this infection is secondary to the bloodstream infection.



Case 12

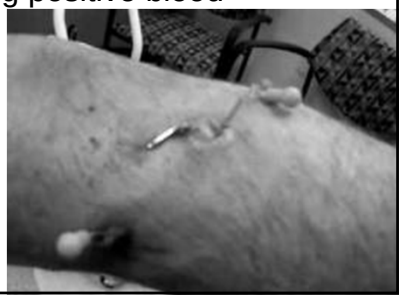
- A male patient underwent a KPRO in April 2010.
- In October 2010, the prosthesis was removed due to an unresolved infection in the joint space with MRSA. A spacer was placed and a replacement procedure was scheduled for the following February 2011.
- The replacement KPRO was completed in February 2011 and, within 3 weeks after discharge, he developed osteomyelitis with MRSA near the attachment site.

How should this osteomyelitis be reported?

1. SSI linked to the April 2010 operative procedure
2. SSI linked to the October 2010 operative procedure
3. SSI linked to the February 2011 operative procedure
4. Does not meet the criteria for SSI

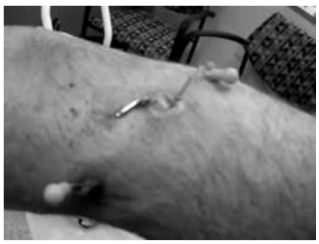
Case 13

Patient had an OREF (**O**pen **R**eduction **Ext**ernal **F**ixation) of the L. tibia (FX, ICD-9-CM 79.26) on Nov 12. His course was uneventful and he was discharged on Nov 20. He was readmitted on Dec 3 with purulent drainage growing MRSA from the proximal pin site, which is not contiguous with the incision, and with a matching positive blood culture.



What should be reported?

1. SSI-SIP and secondary BSI
2. Primary BSI
3. SSI-SIP only
4. None of the above



Case 14

A female patient underwent a KPRO operation on December 22, 2010. She returned to her surgeon on January 31, 2011 with purulent drainage from the superficial incision, which had started 2 days prior.

How should this infection be reported?

1. SSI - SIP
2. SSI - DIP
3. SSI - Organ Space
4. Not reported; does not meet criteria for SSI

Case 15

- A spinal fusion (FUSN) patient was seen in the ER 11 days postop with a large cellulitis, a pain level 10/10, swelling, tenderness, and redness.
- He was admitted for treatment with antibiotics. He had leukocytosis and an elevated CRP (199).
- Serous drainage from the incision was no growth.

Is this superficial incisional or deep incisional SSI?

1. Superficial incisional SSI
2. Deep incisional SSI
3. Neither; the surveillance criteria for SSI are not met

Case 16

- On 1/6, patient underwent a colon resection; perforation of the bowel was identified, repaired and the abdominal incision was closed primarily. A colostomy was formed at that time.
- On 1/23, the patient experienced purulent drainage from the abdominal incision extending to the fascial layer. An aseptic specimen was obtained during a follow-up visit that day with her surgeon, which grew *Escherichia coli.*

Is this infection reportable as an NHSN SSI procedure?

1. No, this is not considered an NHSN procedure
2. Yes, as a superficial incisional SSI at the primary incision
3. Yes, as a deep incisional SSI at the primary incision
4. No, because both sites are not infected; this infection is not reportable.

Great Job!!!

Please place tab here with the number and title 13. MRSA Bacteremia and CDI LabID Event Reporting. Presentation should be double sided, black and white, and 2 slides per page.

Using NHSN for Multidrug Resistant Organism and *Clostridium difficile* Infection (MDRO/CDI) Laboratory-Identified (LabID) Event Reporting

Angela Bivens-Anttila, RN, MSN, NP-C, CIC
Nurse Epidemiologist

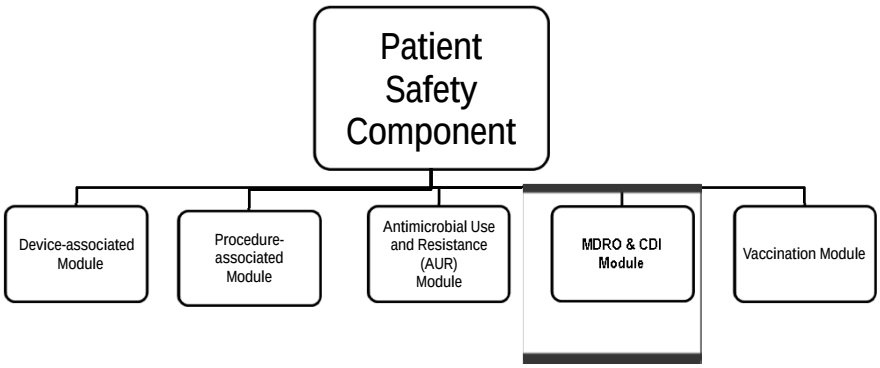
September 13, 2012

National Center for Emerging and Zoonotic Infectious Diseases
Place Descriptor Here

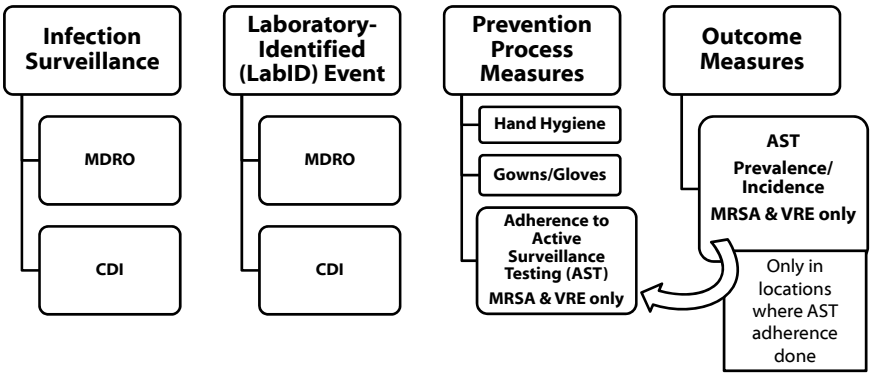
Objectives

- Review the structure of the Multidrug-Resistant Organism & Clostridium *difficile* Infection (MDRO/CDI) Module within the Patient Safety Component of NHSN
- Describe the rationale for monitoring MDROs and CDI
- Review requirements for MRSA Bacteremia and CDI LabID Event reporting to CMS through NHSN
- Describe the methodology, protocols, and definitions used in data collection and reporting under the MDRO/CDI LabID Event Reporting in NHSN
- Review the correct method for entering MRSA Bacteremia and CDI LabID Events into NHSN
- Apply knowledge through case studies

Patient Safety Component
5 Modules



Multidrug-Resistant Organism & *Clostridium difficile* Infection Module (MDRO/CDI)



Background

Goal of the MDRO and CDI Module

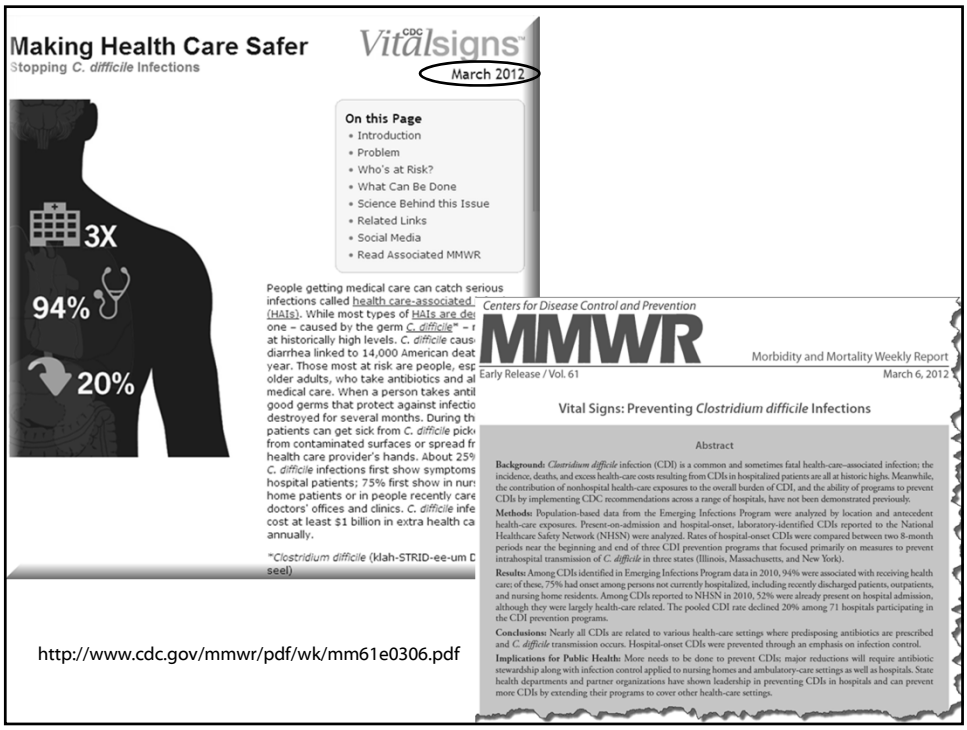
- Monitoring of MDROs and *C. difficile* infection (CDI) helps to evaluate local trends and changes in the occurrence of these pathogens and related infections
- This module provides a mechanism for facilities to report and analyze MDRO and CDI data, in order to inform infection control staff of the impact of targeted prevention efforts

Why C. *difficile*?

- Unlike many causes of healthcare associated infections (HAIs), C. *difficile* diarrheal infections have increased, and are now at **historic highs**
- C. *difficile* infections are linked to about **14,000 deaths** each year, with approximately 90% being among the elderly
- Antibiotic use and healthcare exposure are two of the greatest risk factors
- Careful attention to surface cleaning, and wearing gowns and gloves when treating those known to be infected, can reduce spread by 20%

- Renewed interest:
  - Reporting to CMS via NHSN

CDC. (2012). Vital signs: Preventing clostridium difficile infections, MMWR, 61.



Making Health Care Safer

Stopping *C. difficile* Infections

Vitalsigns™ March 2012

On this Page
- Introduction
- Problem
- Who's at Risk?
- What Can Be Done
- Science Behind this Issue
- Related Links
- Social Media
- Read Associated MMWR

3X

94%

20%

People getting medical care can catch serious infections called health care-associated (HAIs). While most types of HAIs are de one – caused by the germ *C. difficile** – r at historically high levels. *C. difficile* caus diarrhea linked to 14,000 American deat year. Those most at risk are people, esp older adults, who take antibiotics and al medical care. When a person takes antil good germs that protect against infectio destroyed for several months. During th patients can get sick from *C. difficile* pick from contaminated surfaces or spread fr health care provider's hands. About 25% *C. difficile* infections first show symptoms hospital patients; 75% first show in nur home patients or in people recently care doctors' offices and clinics. *C. difficile* infe cost at least $1 billion in extra health ca annually.

**Clostridium difficile* (klah-STRID-ee-um D seel)

Centers for Disease Control and Prevention

MMWR Morbidity and Mortality Weekly Report

Early Release / Vol. 61 March 6, 2012

Vital Signs: Preventing *Clostridium difficile* Infections

Abstract

Background: *Clostridium difficile* infection (CDI) is a common and sometimes fatal health-care–associated infection; the incidence, deaths, and excess health-care costs resulting from CDIs in hospitalized patients are all at historic highs. Meanwhile, the contribution of nonhospital health-care exposures to the overall burden of CDI, and the ability of programs to prevent CDIs by implementing CDC recommendations across a range of hospitals, have not been demonstrated previously.

Methods: Population-based data from the Emerging Infections Program were analyzed by location and antecedent health-care exposures. Present-on-admission and hospital-onset, laboratory-identified CDIs reported to the National Healthcare Safety Network (NHSN) were analyzed. Rates of hospital-onset CDIs were compared between two 8-month periods near the beginning and end of three CDI prevention programs that focused primarily on measures to prevent intrahospital transmission of *C. difficile* in three states (Illinois, Massachusetts, and New York).

Results: Among CDIs identified in Emerging Infections Program data in 2010, 94% were associated with receiving health care; of these, 75% had onset among persons not currently hospitalized, including recently discharged patients, outpatients, and nursing home residents. Among CDIs reported to NHSN in 2010, 52% were already present on hospital admission, although they were largely health-care related. The pooled CDI rate declined 20% among 71 hospitals participating in the CDI prevention programs.

Conclusions: Nearly all CDIs are related to various health-care settings where predisposing antibiotics are prescribed and *C. difficile* transmission occurs. Hospital-onset CDIs were prevented through an emphasis on infection control.

Implications for Public Health: More needs to be done to prevent CDIs; major reductions will require antibiotic stewardship along with infection control applied to nursing homes and ambulatory-care settings as well as hospitals. State health departments and partner organizations have shown leadership in preventing CDIs in hospitals and can prevent more CDIs by extending their programs to cover other health-care settings.

http://www.cdc.gov/mmwr/pdf/wk/mm61e0306.pdf

SHEA/HICPAC Position Paper (October 2008):
Recommendations for MDRO Metrics in Healthcare Settings

- Define reasonable and practical metrics to best measure impact of prevention
- Authors from APIC, CDC, SHEA, HICPAC
- Five Categories of MDRO Outcome Measures
  1. Tracking Patients
  2. Monitoring Susceptibility Patterns
  3. Estimating Infection Burden
  4. Estimating Exposure Burden
  5. Quantifying Healthcare Acquisition (which includes Transmission)

Recommended metrics
from the
SHEA/HICPAC Position Paper
were the basis
for the
new MDRO and CDI Module

Organisms

1) Methicillin-Resistant *Staphylococcus aureus* (MRSA)
[option w/ Methicillin-Sensitive *S. aureus* (MSSA)]

2) Vancomycin-Resistant *Enterococcus* spp. (VRE)

3) Cephalosporin-Resistant (CephR) *Klebsiella* spp.

4) Carbapenem-Resistant (CRE) *Klebsiella* spp.

5) Carbapenem-Resistant (CRE) *E. coli* spp.

6) Multidrug-Resistant (MDR) *Acinetobacter* spp.

7) *Clostridium difficile*

Definitions

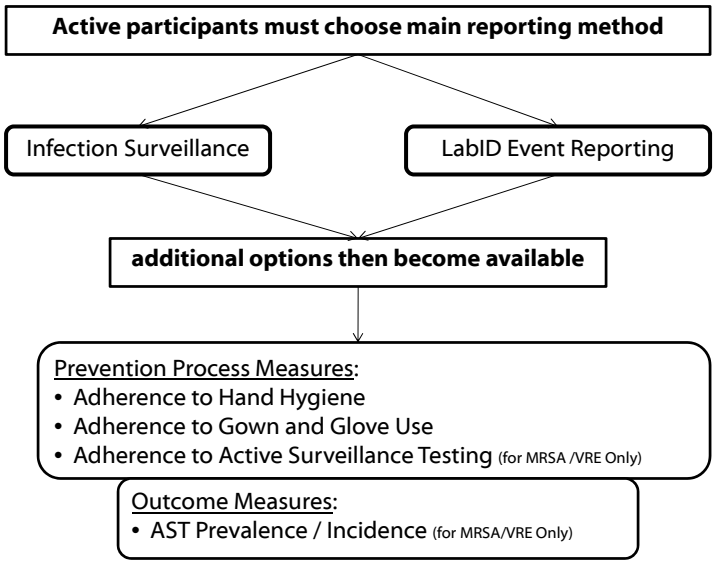
- MRSA: *S. aureus* testing oxacillin, cefoxitin, or methicillin resistant; or positive from molecular testing for mecA and PBP2a
- MSSA: *S. aureus* testing oxacillin, cefoxitin, or methicillin intermediate or susceptible; or negative from molecular testing for mecA and PBP2a
- VRE: Any Enterococcus spp. testing resistant to vancomycin
- CephR-*Klebsiella*: *Klebsiella* spp. testing intermediate or resistant to ceftazidime, ceftriaxone, cefotaxime, or cefepime
- CRE-*Klebsiella*: *Klebsiella* spp. testing intermediate or resistant to imipenem, meropenem, or doripenem
- CRE-*E. coli*: *E. Coli* spp. testing intermediate or resistant to imipenem, meropenem, or doripenem

Definitions (2)

- MDR-*Acinetobacter*: *Acinetobacter* spp. testing intermediate or resistant to at least one drug within at least 3 antimicrobial classes of 6, including:
  β-lactam/β-lactamase inhibitor combo (PIP, PIPTAZ)
  cephalosporins (CEFEP, CEFTAZ)
  carbapenems (IMI, MERO, DORI)
  aminoglycosides (AMK, GENT, TOBRA)
  fluoroquinolones (CIPRO, LEVO)
  sulbactam (AMPSUL)

- *C. difficile*: *C. difficile* is identified as the associated pathogen for LabID Event or HAI reporting [Gastrointestinal System Infection (GI) -Gastroenteritis (GE) or Gastrointestinal Tract (GIT)]

Reporting Requirements and Options



CMS Reporting Requirements
LabID Event for FacWideIN

Healthcare Facility HAI Reporting to CMS via NHSN – Current and Proposed Requirements

DRAFT (11/23/2011)

HAI Event	Facility Type	Reporting Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and abdominal hysterectomy	January 2012
I.V. antimicrobial start	Dialysis Facilities	January 2012
Positive blood culture	Dialysis Facilities	January 2012
Signs of vascular access infection	Dialysis Facilities	January 2012
CLABSI	Long Term Care Hospitals *	October 2012
CAUTI	Long Term Care Hospitals *	October 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
MRSA Bacteremia LabID Event	Acute Care Hospitals	January 2013
C. difficile LabID Event	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Acute Care Hospitals	January 2013
HCW Influenza Vaccination	Outpatient Surgery/ASCs	October 2014
SSI (future proposal)	Outpatient Surgery/ASCs	TBD

* Long Term Care Hospitals are called **Long Term Acute Care Hospitals** in NHSN

CMS 2013
MRSA Bacteremia LabID Event

Organism: Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Data Collection: CDC NHSN - MDRO/CDI Module

Required Locations:
All inpatient locations (=FacWideIN) for LabID Events

Required Data:
Community-Onset (CO) and **Healthcare-Onset (HO)** Event MRSA blood specimens at the facility-wide inpatient level

CMS 2013
C. difficile LabID Event

- **Organism:** Clostridium *difficile* (C. diff)
- **Data Collection:** CDC NHSN - MDRO/CDI Module (LabID Event)
- **Required Locations:** All inpatient locations at Facility-wide Inpatient level (FacWideIN) minus NICU, SCN, or other Well Baby locations (e.g. Nurseries, babies in LDRP)
- **Required Data:**
  - **Community-Onset (CO)** and **Healthcare-Onset (HO) Events**
  - **All** *C. difficile* LabID Events on unformed stool specimens at the facility-wide Inpatient level

Facility-wide Inpatient FacWideIN

Includes all inpatient locations, including observation patients housed in an inpatient location

CMS 2013 What Data Will NHSN Report to CMS?

MRSA Blood and C. *difficile* Healthcare Facility-Onset (HO) LabID Events

CDI: *All non-duplicate, non-recurrent LabID Event specimens collected > 3 days after admission to the facility*

MRSA Blood: *All non-duplicate, LabID Event specimens collected >3 days after admission to the facility*

Important Dates

- Data must be submitted monthly (within 30 days of the end of the month which is collected).
- For data to be shared with CMS, each quarter's data must be entered into NHSN no later than 4 ½ months after the end of the quarter.
  - E.g. Q1 (January-March) data must be entered into NHSN by August 15; Q2 by November 15; Q 3 by February 15 and Q4 by May 15.

Getting Ready for Reporting

Creating a Monthly Reporting Plan

NHSN Home
Reporting Plan
Add
Find
Patient
Event
Procedure
Summary Data
Import/Export
Analysis
Surveys
Users
Facility
Group
Log Out

Logged into DHQP Memorial Hospital (ID 10000) as ANGELA.
Facility DHQP Memorial Hospital (ID 10000) is following the PS component.

View Monthly Reporting Plan

Plan saved successfully.

Mandatory fields marked with *

Facility ID*: DHQP Memorial Hospital (10000)
Month*: July
Year*: 2012

Monthly Reporting Plan

C. diff and MRSA LabID (*blood specimens only*) Events must be included in Monthly Reporting Plan each month for data to be reported on behalf of the facility to CMS

All specimens are not required for CMS, but if state mandates, require facility to report all specimens, then it is okay and only bloods will be counted for CMS reporting

Multi-Drug Resistant Organism Module HELP

Locations	Specific Organism Type
FACWIDEIN - FacWideIN	MRSA - MRSA

Process and Outcome Measures

Infection Surveillance	AST-Timing	AST-Eligible	Incidence	Prevalence	Lab ID Event All Specimens	Lab ID Event Blood Specimens Only	HH	GG
						X		

FACWIDEIN - FacWideIN	CDIF - C. difficile

Process and Outcome Measures

Infection Surveillance	AST-Timing	AST-Eligible	Incidence	Prevalence	Lab ID Event All Specimens	Lab ID Event Blood Specimens Only	HH	GG
					X			

Location Reporting Options

CMS Requirement

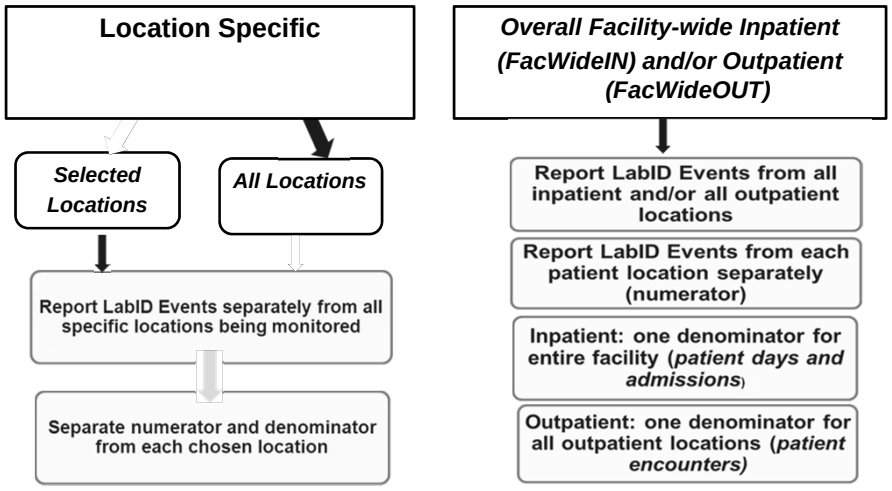
Facility-Wide Inpatient or Facility-Wide Outpatient:

- Options currently available only for LabID Event reporting
- Report from throughout all of a facility's inpatient or outpatient locations
  - Numerator (MDRO/CDI Events)- report separately for each location in facility
  - Single denominators for entire facility:
    - FacWideIN – patient days and admissions
      - Separate counts for MDRO and CDI
      - Minus baby locations for CDI
    - FacWideOUT – encounters

Location Specific:

- Select only a few locations or every location for full facility coverage
- Report separately from each selected location in the facility
- Separate denominators for each location:
  - Patient days and admissions for inpatient locations
  - Encounters for outpatient locations

Location Reporting Options



Adding Locations

Why do I Need to Add Locations?

- Each LabID Event (numerator) is reported according to the patient's location when the specimen is collected
- This means that any inpatient unit could potentially house a patient who has a MRSA blood specimen or C. *difficile* stool specimen LabID Event
- To ensure that a location is available for reporting when a LabID Event is identified:
  - Add all inpatient locations before reporting begins in 2013

PS Home Page: Facility > Locations

Department of Health and Human Services
Centers for Disease Control and Prevention

NHSN - National Healthcare Safety Network (ISD-CLFT-NHSN1) | NHSN Home | My Info | Contact us | Help | Log Out

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- Log Out

Logged into Pleasant Valley Hospital (ID 10312) as DSIEVERT.
Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

NHSN Patient Safety Component Home Page

Use the Navigation bar on the left to access the features of the application.

Assurance of Confidentiality: The information obtained in this surveillance system that would permit identification of any individual or institution is collected with a guarantee that it will be held in strict confidence, will be used only for the purposes stated, and will not otherwise be disclosed or released without the consent of the individual, or the institution in accordance with Sections 304, 306 and 308(d) of the Public Health Service Act (42 USC 242b, 242k, and 242m(d)).

NHSN maintenance may occur nightly between 12am and 6am Eastern time.

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Locations Page: Specify Location Info

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- Log Out

Logged into Pleasant Valley Hospital (ID 10312) as DSIEVERT.
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Locations

HELP *Instructions*

- To ***Add*** a record, fill in the form with the required fields and any desired optional values. Then click on the *Add* button.
- To ***Find*** a record, click on the *Find* button. One of more fields can be filled in to restrict the search to those values.
- To ***Edit*** a record, perform a *Find* on the desired record. Click on the desired record to fill in its values into the form and edit the values. To save the changes, click on the *Save* button.
- To ***Delete*** one or more records, perform a *Find* on the desired record(s). Check the corresponding box(es), then click on the *Delete* button.
- Press the ***Clear*** button to start over with a new form.

Mandatory fields to "Add" or "Edit" a record marked with *

Your Code*: 5W
Your Label*: MED WARD
CDC Location Description*: Inpatient Medical Ward
Status*: Active
Bed Size*: 22 A bed size greater than zero is required for most inpatient locations.

Find | Add | Clear

Find Locations: All or Specific Search

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Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

Locations

HELP *Instructions*

- To ***Add*** a record, fill in the form with the required fields and any desired optional values. Then click on the *Add* button.
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- To ***Delete*** one or more records, perform a *Find* on the desired record(s). Check the corresponding box(es), then click on the *Delete* button.
- Press the ***Clear*** button to start over with a new form.

Mandatory fields to "Add" or "Edit" a record marked with *

Your Code*:
Your Label*:
CDC Location Description*: Inpatient Medical Ward
Status*: Active
Bed Size*: 0 A bed size greater than zero is required for most inpatient locations.

Find | Add | Clear

Location Table

Display All | Print Location List
First | Previous | Next | Last — Displaying 1 - 2 of 2

Delete	Status	Your Code	Your Label	CDC Description	CDC Code	Bed Size
☐	Active	SW	MED WARD	Inpatient Medical Ward	IN:ACUTE:WARD:M	22
☐	Active	INMEDWARD	IN:ACUTE:WARD:M	Inpatient Medical Ward	IN:ACUTE:WARD:M	42

First | Previous | Next | Last — Displaying 1 - 2 of 2

LabID Event Reporting Introduction

Reporting of **proxy** infection measures of MDRO and C. *difficile* **healthcare acquisition**, **exposure burden**, and **infection burden** by using primarily laboratory data. Laboratory testing results can be used without clinical evaluation of the patient, allowing for a much less labor-intensive means to track MDROs and CDI

Overview

MRSA Bacteremia LabID Event Reporting in NHSN

Definition
MRSA Positive Blood Isolate

Any blood specimen obtained for clinical decision making for MRSA

Excludes tests related to active surveillance testing

Definition
MRSA Bacteremia
LabID Event

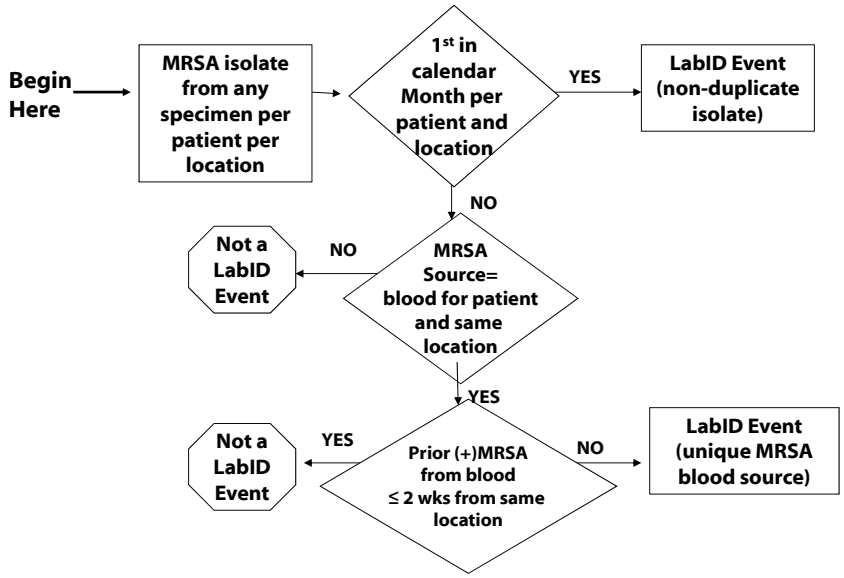
MRSA positive blood specimen for a patient in a location with no prior MRSA positive blood specimen result collected within **14 days** for the patient **and** location

Also referred to as all non-duplicate LabID Events

Definition
Duplicate MRSA Bacteremia
LabID Event

Any MRSA blood isolate from the same patient and same location, following a previous positive MRSA blood laboratory result within the past **14** days

Identifying an MRSA LabID Event



Adapted from Figure 1 MDRO Test Results Algorithm for LabID Events
http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf page 12-22

Summary: MRSA Bacteremia

Purpose: To calculate proxy measures of MRSA bloodstream infections, exposures burdens, and healthcare acquisitions through monitoring and reporting data from positive clinical cultures

LabID Event: A laboratory-identified event. MRSA positive blood specimen for a patient in a location with no prior MRSA positive blood specimen reported within **14 days for the patient and location**. It must be a specimen that is collected for diagnosis/treatment (NO surveillance cultures). A patient in a location in a month can then have additional MRSA blood specimens reported as LabID Events after a full 14-day interval with no positive MRSA blood specimen for the same patient and same location identified by the lab

- LabID Events (numerators) are reported by specific location where the specimen was collected
- Monthly Monitoring Summary Data (denominators) for Total Patient Days and Total Admissions are reported for the overall inpatient facility (FacWideIN)

Add Event - Patient Information

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Centers for Disease Control and Prevention

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- Event
  - Add
  - Find
  - Incomplete
- Procedure
- Summary Data
- Import/Export
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- Facility
- Group
- Log Out

Logged into Pleasant Valley Hospital (ID 10312) as DSIEVERT.
Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

Add Event

Mandatory fields marked with *
Fields required for record completion marked with **
Fields required when in Plan marked with >

Print PDF Form

Patient Information HELP

Facility ID*: Pleasant Valley Hospital (ID 10312) Event #: 24941
Patient ID*: DS3636 Find Find Events for Patient
Social Security #: Secondary ID:
Last Name: First Name:
Middle Name:
Gender*: F - Female Date of Birth*: 05/16/1943
Ethnicity:
Race: ☐ American Indian/Alaska Native ☐ Asian ☐ Black or African American ☐ Native Hawaiian/Other Pacific Islander ☐ White

Add Event Information

Event Information HELP

Event Type*: LABID - Laboratory-identified MDRO or CDAD Event
Date Specimen Collected*: 01/14/2013
Specific Organism Type*: MRSA - MRSA
Outpatient*: N - No
Specimen Body Site/Source*: CARD - Cardiovascular/ Circulatory/ Lymphatics
Specimen Source*: BLDSPC - Blood specimen
Date Admitted to Facility*: 01/09/2013
Location*: INMSWARD - IN:ACUTE:WARD:MS
Date Admitted to Location*: 01/09/2013
Documented prior evidence of previous infection or colonization with this specific organism type from a previously reported LabID Event?: N - No
Has patient been discharged from your facility in the past 3 months?*: N - No

Entries for Blood LabID Events

Patient Location when Specimen Collected

Auto-filled

NHSN will Categorize your MRSA Blood Specimen LabID Events as CO or HO

NHSN Application Categorizes* LabID Events As:

- **Community-Onset (CO):** LabID Event specimen collected as an inpatient ≤ **3 days** after admission to the facility (i.e., days 1 (admission), 2, or 3)
- **Healthcare Facility-Onset (HO):** LabID Event specimen collected **> 3 days** after admission to the facility (i.e., on or after day 4)

*Based on Inpatient Admission & Specimen Collection Dates

Overview

CDI LabID Event Reporting in NHSN

Definition
CDI Positive Laboratory Assay

- A positive laboratory test result for C. *difficile* toxin A and/or B **

OR

- A toxin-producing C. *difficile* organism detected by culture or other laboratory means performed on a stool sample

Remember.. C. difficile testing only on unformed stool samples (should conform to shape of container)

***Positive PCR result for toxin producing gene is equal to a positive C. diff test result*

Definition
CDI LabID Event

A toxin-positive C. *difficile* stool specimen for a patient in a location with no prior C. *difficile* specimen result reported within **14 days** for the patient **and** location

Also referred to as all non-duplicate LabID Events

Definition
Duplicate C. *difficile* Positive Test

Any C. *difficile* toxin-positive laboratory result from the same patient and same location, following a previous C. *difficile* toxin-positive laboratory result within the past **14** days

Identifying a *C. difficile* LabID Event

Figure 2. C. difficile test Results Algorithm for Laboratory-Identified (LabID) Events

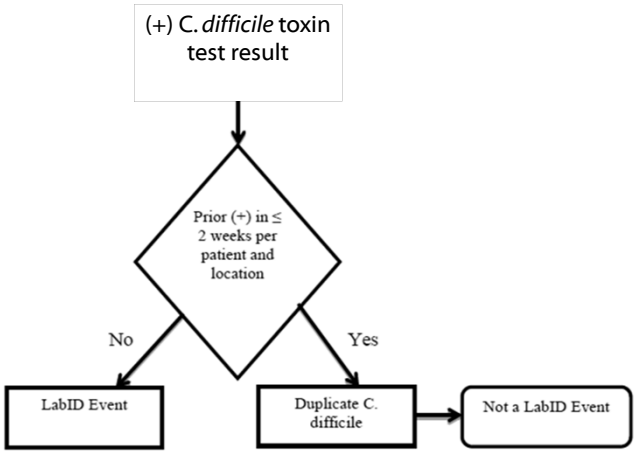
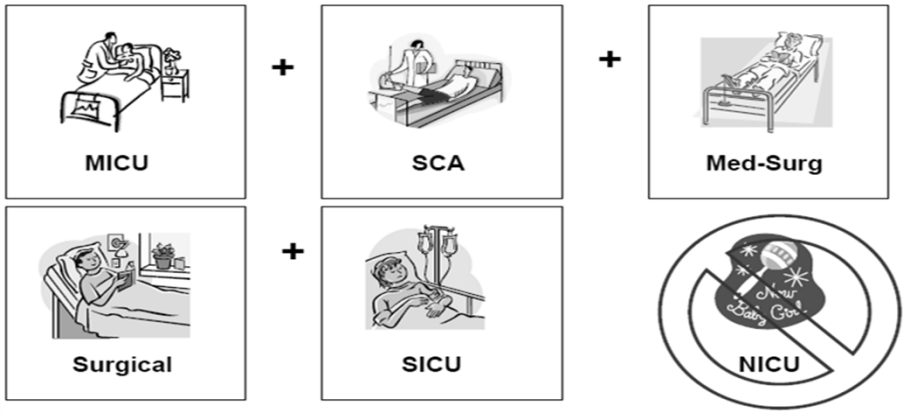


Figure 2. *C. difficile* Test Results Algorithm for LabID Events
http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf page 12-23

Facility-wide Inpatient (FacWideIN) Reporting for CDI



Summary: C. *difficile*

Purpose:
To calculate proxy measures of *C. difficile* infections, exposures burdens, and healthcare acquisitions through monitoring and reporting data from positive clinical cultures (unformed stool only)

LabID Event:
A laboratory-identified event. A toxin-positive / toxin-producing *C. difficile* stool specimen for a patient in a location with no prior *C. difficile* specimen reported within 14 days for the patient and location, and having a full 14-day interval with no toxin-positive *C. difficile* stool specimen identified by the lab since the prior reported *C. difficile* LabID Event. Also referred to as non-duplicate C. *difficile* toxin-positive laboratory result

- LabID Events (numerators) are reported by specific location where the specimen was collected
- Monthly Monitoring Summary Data (denominators) for Patient Days and Admissions (*minus all NICU, SCN, and Well Baby locations, including LDRP baby counts*) are reported for the overall inpatient facility (FacWideIN)

LabID Event Report Form

NHSN Laboratory-identified MDRO or CDI Event

OMB No. 0920-0666
Exp. Date: xx-xx-xxxx

*required for saving

Facility ID: | Event #:
*Patient ID: | Social Security #:
Secondary ID:
Patient Name, Last: First: Middle:
*Gender: M F | *Date of Birth:
Ethnicity (Specify): | Race (Specify):

Event Details

*Event Type: LabID | *Date Specimen Collected:
*Specific Organism Type: (Check one)
☐ MRSA ☐ MSSA ☐ VRE ☐ *C. difficile*
☐ CephR-*Klebsiella* ☐ CRE-*Ecoli* ☐ CRE-*Klebsiella* ☐ MDR-*Acinetobacter*
*Outpatient: Yes No | *Specimen Body Site/System: | *Specimen Source:
*Date Admitted to Facility: | *Location: | *Date Admitted to Location:
*Has patient been discharged from your facility in the past 3 months? Yes No
If Yes, date of last discharge from your facility:

Custom Fields

Label ___ ___/___/___ | Label ___ ___/___/___

Add Patient Information

- The top section of data collection form is used to collect patient demographics. Required fields have an asterisk (*).
- There are 4 required fields:
  - Facility ID
  - Patient ID
  - Gender
  - Date of Birth

Add Event Information

Event Information HELP

Event Type*: LABID - Laboratory-identified MDRO or CDI Event

Date Specimen Collected*: 01/13/2013

Specific Organism Type*: CDIF - C. difficile

Outpatient*: N - No

Specimen Body Site/Source*: DIGEST - Digestive System

Specimen Source*: STOOL - Stool specimen

Date Admitted to Facility*: 01/11/2013

Location*: INGI(WARD) - IN:ACUTE:WARD(GI)

Date Admitted to Location*: 01/11/2013

Documented prior evidence of previous infection or colonization with this specific organism type from a previously reported LabID Event?: N - No

Has patient been discharged from your facility in the past 3 months?*: Y - Yes

Date of last discharge from your facility*: 12/19/2012

Auto-filled when LabID and CDIF selected

Patient Location when Specimen Collected

Auto-filled

NHSN will Categorize CDI LabID Events Based on Inpatient Admission & Specimen Collection Dates

- **Healthcare Facility-Onset (HO):** LabID Event specimen collected > 3 days after admission to the facility (i.e., on or after day 4)
- **Community-Onset (CO):** LabID Event specimen collected as an inpatient ≤ **3 days** after admission to the facility (i.e., days 1 (admission), 2, or 3)
- **Community-Onset Healthcare Facility-Associated (CO-HCFA):** CO LabID Event collected from a patient who was discharged from the facility ≤ **4 weeks** prior to the date current stool specimen was collected

NHSN will Further Categorize CDI LabID Events based on Specimen Collection Date & Prior Specimen Collection Date of a Previous CDI LabID Event (that was entered into NHSN)

- **Incident CDI Assay:** Any CDI LabID Event from a specimen obtained > **8 weeks** after the most recent CDI LabID Event (or with no previous CDI LabID Event documented) for that patient.
- **Recurrent CDI Assay:** Any CDI LabID Event from a specimen obtained > **2 weeks** and ≤ **8 weeks** after the most recent CDI LabID Event for that patient.

Provision to LabID Event Reporting for CDI and MRSA Bacteremia

A LabID Event for an inpatient location can include specimens collected during an emergency department or other outpatient clinic visit, if collected same calendar day as patient admission.

**Location will be assigned to the admitting inpatient location (for FacWideIN).

***If participating in both inpatient and outpatient LabID reporting, report the LabID Event in both locations as two separate Events, ED and admitting location.

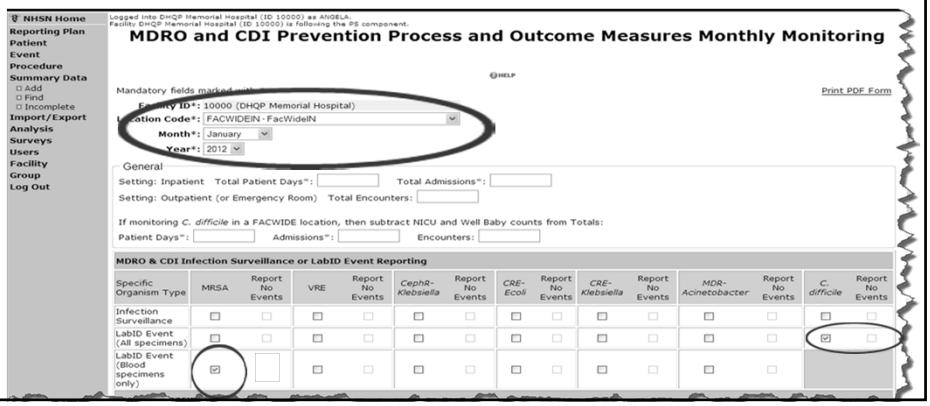
Rules for Entering MRSA Blood and C. diff LabID Events FacWideIN

- C. diff toxin-positive and MRSA blood specimens MUST be monitored throughout all inpatient locations within a facility
  - *Exception for C. diff*: NICUs, SCN, Well Baby Nurseries, and babies in LDRP units excluded
- LabID Event(s) MUST be entered whether community-onset (CO) or healthcare facility-onset (HO)
- A specimen (C. diff stool and/or MRSA blood) qualifies as a LabID Event if there has not been a previous positive laboratory result for the patient and location within the previous 14 days
- LabID Events never include results from Active Surveillance Testing

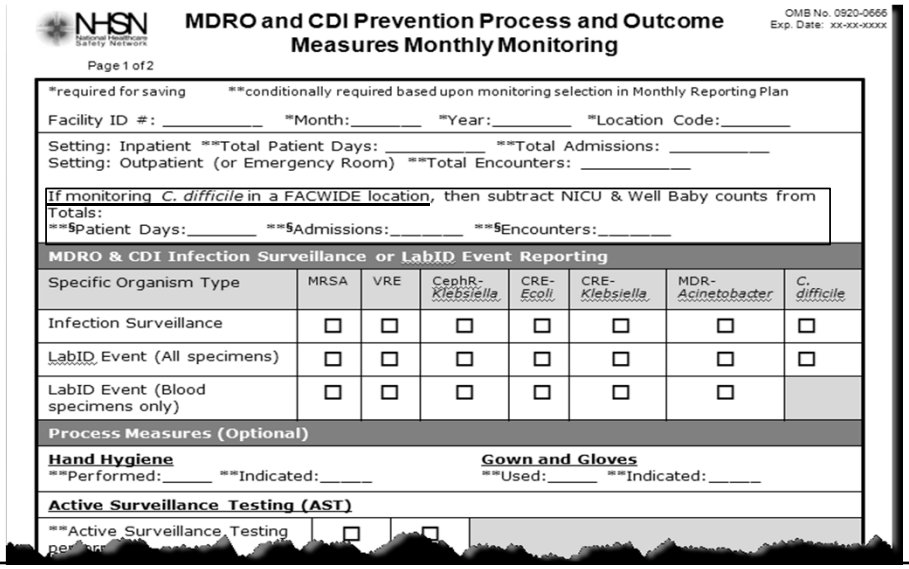
Entry of Monthly Denominator Data for FacWideIN LabID Event Reporting

Summary Data – FacWideIN Location

- Each monthly Summary Data (denominator) is reported at the inpatient facility-wide level = "FacWideIN"
- FacWideIN is a 'virtual' location within NHSN, which means the user does not define it like other specific units/locations



MDRO/CDI Summary Form (Denominators)



NHSN National Healthcare Safety Network

MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring

OMB No. 0920-0666
Exp. Date: xx-xx-xxxx

Page 1 of 2

*required for saving **conditionally required based upon monitoring selection in Monthly Reporting Plan

Facility ID #: _____ *Month:_____ *Year:_____ *Location Code:_____

Setting: Inpatient **Total Patient Days: _____ **Total Admissions: _____
Setting: Outpatient (or Emergency Room) **Total Encounters: _____

If monitoring *C. difficile* in a FACWIDE location, then subtract NICU & Well Baby counts from Totals:
**§Patient Days:_____ **§Admissions:_____ **§Encounters:_____

MDRO & CDI Infection Surveillance or LabID Event Reporting

Specific Organism Type	MRSA	VRE	CephR-*Klebsiella*	CRE-*Ecoli*	CRE-*Klebsiella*	MDR-*Acinetobacter*	*C. difficile*
Infection Surveillance	☐	☐	☐	☐	☐	☐	☐
LabID Event (All specimens)	☐	☐	☐	☐	☐	☐	☐
LabID Event (Blood specimens only)	☐	☐	☐	☐	☐	☐	

Process Measures (Optional)

Hand Hygiene
**Performed:_____ **Indicated:_____

Gown and Gloves
**Used:_____ **Indicated:_____

Active Surveillance Testing (AST)

**Active Surveillance Testing

Choose Summary Data and Add
Select Summary Data Type > Continue

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NHSN Home
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Log Out

Logged into Pleasant Valley Hospital (ID 10312) as DSIEVERT.
Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

Add Patient Safety Summary Data

Summary Data Type: MDRO and CDAD Prevention Process and Outcome Measures Monthly Monitoring

Continue Back

Enter Location Code = FacWideIN plus Month and Year

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Centers for Disease Control and Prevention

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Facility
Group

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Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring

Save of Summary Data successful.

HELP

Mandatory fields marked with * Print PDF Form

Facility ID*: 10312 (Pleasant Valley Hospital)
Location Code*: FACWIDEIN - FacWideIN
Month*: January
Year* 2013

General

Enter All Required Facility-Wide Inpatient Counts

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Centers for Disease Control and Prevention

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Facility Pleasant Valley Hospital (ID 10312) is following the PS component.

MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring

Save of Summary Data successful.

HELP

Mandatory fields marked with *

Print PDF Form

Facility ID*: 10312 (Pleasant Valley Hospital)
Location Code*: FACWIDEIN - FacWideIN
Month*: January
Year 2013

MRSA Bacteremia

General
Setting: Inpatient Total Patient Days*: 680 Total Admissions*: 135
Setting: Outpatient (or Emergency Room) Total Encounters:

C. *difficile*

If monitoring *C. difficile* in a FACWIDE location, then subtract NICU and Well Baby counts from Totals:
Patient Days*: 478 Admissions*: 98 Encounters:

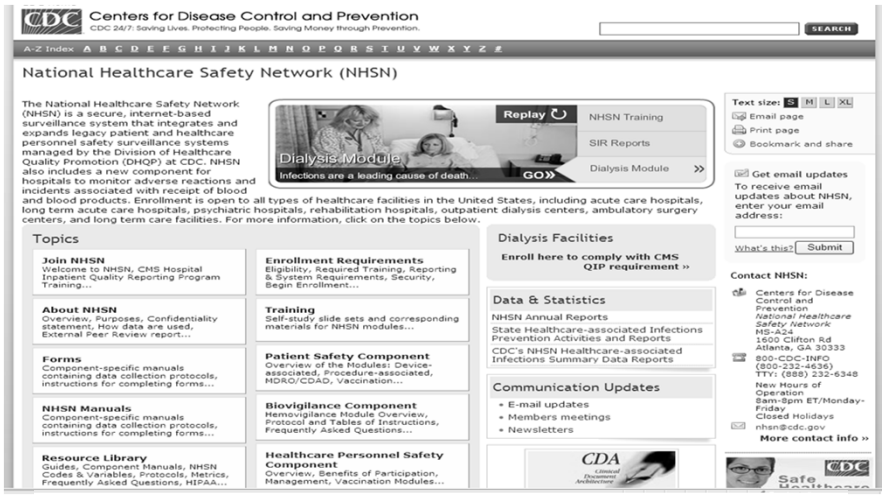
MDRO & CDI Infection Surveillance or LabID Event Reporting

Specific Organism Type	MRSA	VRE	*CephR-Klebsiella*	*CRE-Ecoli*	*CRE-Klebsiella*	*MDR-Acinetobacter*	*C. difficile*
Infection Surveillance							
LabID Event (All specimens)							* X
LabID Event (Blood specimens only)	* X						

Auto-filled

Resources

Resources for NHSN



http://www.cdc.gov/nhsn/index.html

Resources for MDRO/CDI LabID Event Reporting

- NHSN Patient Safety Component Manual
  - Ch 12: MDRO and CDI Module (January 2012); pages 18-21

    http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf
  - Ch 14: Tables of Instructions, Table 19, 21

    http://www.cdc.gov/nhsn/PDFs/pscManual/14pscForm_Instructions_current.pdf

- Determining Patient Days for Summary Data Collection: Observation vs. Inpatients

  http://www.cdc.gov/nhsn/PDFs/PatientDay_SumData_Guide.pdf

http://www.cdc.gov/nhsn/TOC_PSCManual.html

Resources for MDRO/CDI LabID

- NHSN Forms (January 2012)
  - 57.106: Monthly Reporting Plan
  - 57.128: LabID MDRO or CDI Event Form (numerator)
  - 57.127: MDRO and CDI Prevention Process and Outcomes Measures Monthly Reporting (denominator)

http://www.cdc.gov/nhsn/forms/Patient-Safety-forms.html#mdro

Available Training

- C. difficile Guidelines for Clinicians
  - http://www.cdc.gov/HAI/organisms/cdiff/Cdiff_clinicians.html
- Training
  - Lectoras (coming soon)
- NHSN Training Website: http://www.cdc.gov/nhsn/training/
  - Currently updating site with updated LabID Event Reporting presentations

Please place tab here with the number and title 14. MRSA/CDI Case Studies: Audience Response. Presentation should be double sided, black and white, and 2 slides per page.

Case Studies

Ground Rules for Case Studies

- Purposes:
  - Training on use of definitions AS THEY EXIST
  - Surveillance ≠ clinical
- Examples highlight common errors/difficult issues
- Lab ID Event reporting is a **proxy measure** to lighten the load of surveillance, but this reduction in burden is traded off with a decreased specificity as it relates to true infection and attribution

Case 1

- 2/1: 56 year old male admitted to ICU bed with pneumonia. Central IV inserted for antibiotics.
- 2/2: Patient voiding without difficulty. Cough with moderate sputum production. Patient complains of lower abdominal cramps, relieved with medication.
- 2/3: Patient transfers to 2E. Later that day, patient has fever of 38.2 and complains of worsening lower abdominal pain. BM with loose unformed stool.

Case 1

- 2/4: While on 2E, the patient continues to complain of lower abdominal pain and loose stools. Over the course of 24 hours, the patient had three loose stools. Unformed stool specimen collected and sent for testing.
- 2/5: Lab results identified toxin positive C. *difficile* toxin stool samples.

Case 1
For FacWideIN LabID reporting, would you enter this as a CDI LabID Event?

1. No. His symptoms started <4 days after admission.
2. Yes. This is the first positive CDI isolate collected in this inpatient location within 14 days.
3. No. C. *difficile* toxin assay is not an accurate test for CDI.

Case 1
What Location is CDI Attributed?

1. ICU
2. 2E
3. Lab
4. FacWideIN

Case 2

3/1: Patient presents to the emergency department with complaints of diarrhea and lower abdominal pain for the past three days. Patient states that he has been on antibiotics for 10 days for tooth abscess. A stool specimen is collected while the patient is in the emergency department and toxin assay is positive for C. *difficile*.

3/1: Patient admitted to 2S medical unit for intravenous hydrations and medical management.

Case 2

For FacWideIN LabID reporting. Can this result be entered as a LabID Event and, if so, what location would be entered?

1. No. ED is an outpatient location and I am only monitoring inpatient locations.
2. Yes. Location would be the ED since specimen was collected there.
3. Yes. Location would be 2S, the admitting location.
4. Yes. Location would be FacWideIN.

Case 2
What if you are participating in both FacWideIN and ED location specific reporting?

1. Report the positive CDI LabID Event separately, once for ED and again for 2S.
2. Report only as FacWideIN.
3. Report only as FacWideOUT.
4. Toss a coin to make location selection.

Case 3

- 2/15: 55 year old patient with end stage pancreatic cancer with liver & bone mets admitted to inpatient unit, 3E, from hospice facility. The patient has no previous history of inpatient admission to this facility. Upon admission to 3E, patient is noted to have foul loose stools. After three episodes of loose stools over the course of 24 hours, an unformed specimen was collected and tested positive for C. *difficile* toxin.

Case 3

For FacWideIN LabID reporting Should this be entered into NHSN as a LabID Event?

1. YES. Specimen was collected from 3E inpatient location
2. NO. This infection belongs to the Hospice

Case 3

How will NHSN Categorize the CDI Event?

1. Community-onset (CO)
2. Healthcare-Facilty onset (HO)
3. Community-Onset Healthcare Facility-Associated (CO-HCFA)
4. NHSN will not categorize the event, the user will need to make the decision

Case 3

What if the Stool Specimen was Collected 4 Days after Admission to the Hospital?

1. Community-onset (CO) since the patient was admitted with symptoms of foul stool
2. Healthcare-Facility onset (HO) since the specimen was collected more than 3 days after admission
3. Community-Onset Healthcare Facility-Associated (CO-HCFA) since the patient was admitted from another healthcare facility

Case 4

A toxin positive C. *difficile* stool specimen collected from a inpatient on day 4 of admission would be categorized as:

1. Healthcare Facility-Onset (HO)
2. Community-Onset (CO)
3. Community-Onset Healthcare Facility-Associated (CO-HCFA)
4. It depends on the patients history

Case 4

What if the patient was symptomatic on admission, but the toxin was negative on admission and positive on day 4 of admission?

1. I can over-ride NHSN and categorize the event as community-onset
2. NHSN will categorize as community-onset
3. NHSN will categorize as healthcare-onset

Case 5

In preparation for upcoming CMS reporting requirements for CDI LabID Events, you are completing your NHSN monthly reporting plan. What location(s) will you select if you are only reporting based on CMS?

1. ICU, NICU, medical-surgical units, emergency department, oncology.
2. Emergency department, outpatient surgery, and affiliated physician offices.
3. FacWideIN, which includes all inpatient locations, except no monitoring in NICU and Well Baby locations.
4. FacWideOUT, which includes all outpatient locations affiliated with the facility.

Case 5

FacWideIN is a 'virtual' location within NHSN, which means the user does not define it like other specific units/locations, and it is only used in the Monthly Reporting Plan, Summary Data Reporting Form (denominator), and for Conferring Rights.

Case 6

What denominator data is entered for CDI LabID Event Monitoring, FacWideIN?

1. Patient admissions by each unit and total patient days by unit.
2. C. diff patient days and admissions for all inpatient locations minus NICU, SCN, and Well Baby location counts, including LDRP locations.
3. Total patient days and total admissions for all inpatient locations.
4. Total patient encounters.

Case 7

- 6/15: 25 year old patient with Crohn's disease is admitted from the ED to a 3 East inpatient unit for corticosteroid treatment and pain management. Peripheral IV is inserted in the ED and patient is receiving intravenous fluids.
- 6/16: Patient request bedside commode and complains of frequent urination and burning during urination. A urine culture is collected via straight cath. Patient afebrile.
- 6/18: Urine culture results are positive for E. coli and MRSA. Antibiotic treatment begun.

Case 7

- 6/21: Patient spikes a temperature of 101.4 F. Blood cultures collected from peripheral IV site.
- 6/22: Two of two blood cultures are positive for MRSA.

Case 7

Since your facility participates in MRSA bacteremia LabID Event Reporting for FacWideIN, would you report this positive blood culture as a LabID Event?

1. No. Since the patient already had a positive urine culture with MRSA for this month and location, the MRSA blood is considered a duplicate.
2. Yes. This is considered a unique blood source.

Case 7

What if the patient had a previous positive MRSA blood culture one week prior to this culture while in the same location (3 East)?

1. This would NOT be a MRSA bacteremia LabID Event
2. I would report as a MRSA bacteremia LabID Event
3. I would report as an Infection Surveillance Event

Case 8

6/1: Mr. Nasal, a local nursing home resident, is admitted to the ICU with a stage 4 sacral ulcer. Upon admission into the ICU, an active nasal screen tested positive for MRSA. Blood cultures were also collected upon admission to the ICU.

Case 8
Should this positive MRSA nasal screen be entered into NHSN as a MDRO/MRSA LabID Event?

1. YES
2. NO

Case 8

What if the blood culture also tested positive for MRSA?

1. NO. I would not consider this to be a MDRO LabID Event since the patient had a MRSA positive nasal screen.
2. YES. Since the blood culture was obtained for clinical decision making, I would report this as a MRSA bacteremia LabID Event .

Case 9

What denominator data is entered for MRSA Bacteremia LabID Event Monitoring for FacWideIN?

1. Patient admissions by each unit and total patient days by unit.
2. Patient days and admissions for all inpatient locations minus NICU and Well Baby location counts.
3. Patient days and admissions for all inpatient locations.
4. Total patient encounters

Case 10

In preparation for upcoming CMS reporting requirements for MRSA Bacteremia LabID Events, you are completing your NHSN monthly reporting plan. What location(s) will you select if you are only reporting based on CMS?

1. ICU, NICU, medical-surgical units, emergency department, oncology.
2. FacWideIN, which includes all inpatient locations.
3. FacWideIN, which includes all inpatient locations, except no monitoring in NICU and Well Baby locations.
4. FacWideOUT, which includes all outpatient locations affiliated with the facility.

Case 11

A positve MRSA blood specimen collected from an inpatient on day 4 of admission would be categorized as:

1. Healthcare Facility-Onset (HO)
2. Community-Onset (CO)
3. Community-Onset Healthcare Facility-Associated (CO-HCFA)
4. It depends on the patient's history

Case 11

What if the patient was symptomatic for sepsis on admission, but the blood culture was not collected until day 4 of admission?

1. I can over-ride NHSN and categorize the event as community-onset
2. NHSN will categorize as community-onset
3. NHSN will categorize as healthcare-onset

Case 12

For FacWideIN reporting:

Are LabID Events reported to NHSN for patients housed in Observation locations?

1. YES.
2. NO.

Case 12

- Are patients housed in Observation locations included in patient days and admission counts for **FacWideIN** reporting?

- NO.
- YES.

Case 13

For **FacWideIN** Reporting:

Are LabID Events reported to NHSN for Observation patients housed in inpatient locations within the facility?

1. YES
2. NO

Case 13

- Are observation patients housed in an inpatient location (e.g., ICU) included in patient days and admission counts for **FacWideIN** reporting?

- NO.
- YES.

Case 14
Identify the LabID Events

	Pt	Admit Date/ Loc	Specimen Collection Date/Loc	Specimen Source	Lab Result	LabID Event? location?	Explanation
1	Jack	6/1/12 ICU	6/1/12 ED	Stool	C. diff + toxin		
2	Jack	6/1/12 ICU	6/2/12 ICU	Blood	MRSA		
3	Jack	6/1/12 ICU	6/12/12 ICU	Blood	MRSA		
4	Jack	6/1/12 ICU	6/20/12 ICU	Blood	MRSA		
5	Jack	6/1/12 ICU	7/10/12 ICU	Blood	MRSA		
6	Jack	6/1/12 ICU	7/15/12 2 East	Blood	MRSA		

Assume all specimens collected are shown

Case 15
Identify the LabID Events

	Pt	Admit Date/Loc	Specimen Collection Date/Loc	Specimen Source	Lab Result	LabID Event? Location?	Explanation
1	Bill	6/15/12 CCU	6/16/12 CCU	Blood	MRSA		
2	Bill	6/15/12 CCU	6/20/12 3-East	Blood	MRSA		
3	Dog	7/2/12 ICU	7/1/12 ED	Stool	C. diff + toxin		
4	Dog	7/2/12 ICU	7/6/12 ICU	Stool	C. diff + toxin		
5	Dog	7/2/12 ICU	7/10/12 2-West	Stool	C. diff + toxin		
6	Joe	6/1/12 ICU	6/6/12 ICU	Stool	C. diff equiv toxin		

Assume all specimens collected are shown

Case 16
Identify the LabID Events

	Pt	Admit Date/ Loc	Specimen Collection Date/Loc	Specimen Source	Lab Result	LabID Event? Location?	Explanation
1	Jim	8/2/12 CCU	8/2/12 CCU	Nares	MRSA		
2	Jim	8/2/12 CCU	8/6/12 CCU	Blood	MRSA		
3	Sam	7/2/12 ICU	7/9/12 ICU	Stool	C. diff + assay - toxin		
4	Sam	7/2/12 NICU	7/6/12 NICU	Stool	C. Diff +toxin		
5	Paul	8/2/12 M/S	8/5/12 M/S	Wound	MRSA		
6	Paul	8/2/12 M/S	8/5/12 M/S	Blood	MRSA		

Assume all specimens collected are shown

Great Job!!!

Determining Patient Days for Summary Data Collection: Observation vs. Inpatients

In response to questions regarding how to count patient days for "observation" patients, the following guidance is offered.

The NHSN instructions for recording the number of patients in an inpatient unit state that for each day of the month selected, at the same time each day, the number of patients on the unit should be recorded. This procedure should be followed regardless of the patient's status as an observation patient or an inpatient.

1. Observation patients in observation locations:
   An "observation" location (e.g., 24-hour observation area) is considered an outpatient unit, so time spent in this type of unit does not ever contribute to any inpatient counts (i.e., patient days, device days, admissions). Admissions to such outpatient units represent "encounters" for the purposes of outpatient surveillance for LabID Event monitoring in the MDRO/CDI module.

2. Observation patients in inpatient locations:
   a. If an observation patient is transferred from an observation location and admitted to an inpatient location, then only patient days beginning with the date of admission to the inpatient location are to be included in patient day counts (for the location or facility-wide inpatient). In this same way, device days accrue beginning when the patient arrives in any location where device-associated surveillance is occurring and in accordance with the location's device-count methods.

   b. If an observation patient is sent to an inpatient location for monitoring, the patient should be included for all patient and device day counts. The facility assignment of the patient as an observation patient or an inpatient has no bearing in this instance for counting purposes, since the patient is being housed, monitored, and cared for in an inpatient location.

Please place tab here with the number and title 15. Location Mapping. Presentation should be double sided, black and white, and 2 slides per page.

Mapping Locations for NHSN Surveillance: Preparing for 2013

Maggie Dudeck, MPH, CPH

NHSN Training Course
Atlanta, GA
October 4, 2012

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Objectives

- Review importance of location mapping in NHSN
- Define key terms used when mapping locations
- Outline the steps for defining and mapping locations for NHSN surveillance

Our Plan for this session…

- **We will go through some straight-forward, as well as some more complex examples of location mapping**
- **We *won't* discuss, as a group, some of the unique situations each of you may have**
  - If you have a unique situation in which the location mapping process cannot answer, please instead email us at nhsn@cdc.gov

Documents

- **The following documents will be discussed in this training:**
  - ***Defining Patient Care Locations in NHSN***
    - Decision-making tool with decision tree
    - In your Resource Book
  - ***CDC Location Labels and Location Descriptions***
    - Provides definitions of each CDC location used for NHSN surveillance
    - http://www.cdc.gov/nhsn/PDFs/pscManual/15LocationsDescriptions_current.pdf

Importance of Correct Location Mapping

- **NHSN location types are developed in order to identify "like populations" within different facilities.**
- **Like populations are believed to have similar risks for healthcare-associated infections (HAIs)**
  - Similar medical devices
  - Similar invasive procedures
  - Similar host factors affecting susceptibility
- **Many NHSN surveillance modules utilize location type as a risk factor, e.g. CLABSI, CAUTI, VAP, MDRO/CDI, etc.**

Importance of Correct Location Mapping

- **NHSN pooled mean rates of infection are calculated for location types and utilized in data analysis, such as the Standardized Infection Ratio.**
- **Incorrectly mapped locations affect the validity of:**
  - NHSN database data
  - Facility-based standardized infection ratios
- **State validations**

Bottom line: Without correctly mapped locations, facilities cannot compare their data to the NHSN data and NHSN data validity is compromised for identifying trends in HAIs.

Why now???

- **Hospitals participating in CMS's Hospital IQR program will be required to report MRSA bacteremia LabID events and *C. difficile* LabID events to NHSN beginning January 2013**
  - This requires the mapping of **every** inpatient unit in your facility to a CDC-defined location for appropriate numerator reporting
- **We recommend that facilities begin this process now, in preparation for reporting in 2013.**

NHSN Location Terms

- **NHSN 80% Rule**
- **Virtual Locations**
- **Mixed Acuity Unit**

NHSN 80% Rule

- Each patient care area in a facility that is monitored in NHSN is "mapped" to one or more CDC locations
- The specific CDC location code is determined by the type of patients cared for in that area, over the last full year, according to this rule
- **If ≥ 80% of patients are of a certain type, then that area is designated as that type of location**

NHSN 80% Rule

- **Example:**
  - If ≥ 80% of patients in an area are pediatric patients with orthopedic problems, the area would be mapped as an "Inpatient Pediatric Orthopedic Ward"
    - 100% of the patients in this unit would be included for surveillance.

Virtual Locations

- Created in NHSN when a facility is unable to meet the 80% Rule for location designation in a single physical unit, but would like to report their NHSN surveillance data for each of the major, specific patient types in that unit

Virtual Locations

- **Example:**
  - 5 West ICU: Approximately 50% neurology patients and 50% neurosurgery patients
  - Rather than map as a medical/surgical critical care unit, the facility can create 2 locations in NHSN:
    - 5WEST_N: Neurologic Critical Care
    - 5WEST_NS: Neurosurgical Critical Care

Virtual Locations

- **Example cont.:**
  - Facility will collect and enter data for 5WEST_N and 5WEST_NS separately
  - Facility will obtain rates and standardized infection ratios (SIRs) for each location separately

Virtual Locations

- **NOTE**: The option of creating virtual locations may be easier for those physical units that are geographically split by patient service or those in which beds are designated by service
- For facilities using an electronic source for collecting data, the compatibility of virtual locations in NHSN should be discussed with the EHR contact prior to reporting data for these locations

Mixed Acuity Unit

- Intended for units comprised of patients with varying levels of acuity, e.g., CC and Step down; CC and ward
- CDC does not have plans to publish national pooled mean rates for this location type
- If your facility chooses to use this location designation for reporting, you will not be able to compare your mixed acuity unit rates to an NHSN pooled mean, nor will these data be included in any SIR analyses

Mixed Acuity Unit

- Implications on data reported for the CMS Hospital Inpatient Quality Reporting Program and/or state's reporting mandate(s):
  - Mixed Acuity Units are not included in any ICU-specific reporting requirements
  - Contact your Quality Improvement Organization (QIO) for more information on how this location designation may impact compliance with CMS HAI reporting measures
  - For state mandates, contact the state HAI coordinator

    http://www.cdc.gov/HAI/state-based/index.html

Defining Patient Care Locations in NHSN

STEPS FOR DEFINING A CDC LOCATION

Steps for Defining Locations in NHSN

- **Step 1: Define the acuity level for the location**
- **Step 2: Define the type of service for the location**

Step 1: Acuity Level

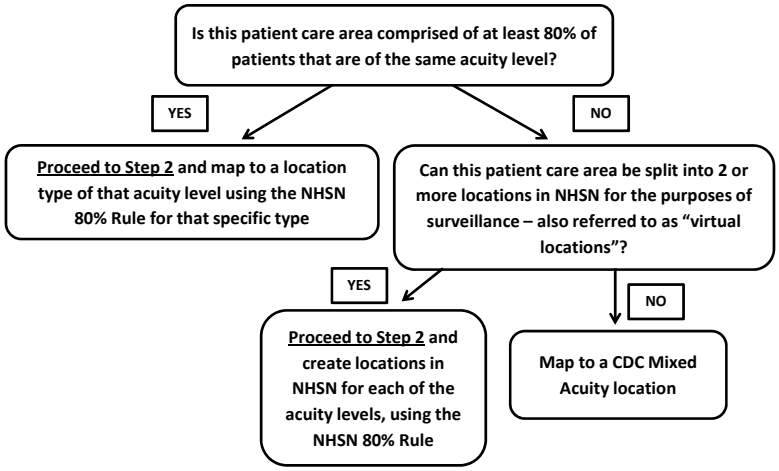
- **Is this patient care area comprised of at least 80% of patients that are of the same acuity level?***
  - Examples of acuity levels:
    - Critical Care Units (CC)
    - Inpatient Specialty Care Areas (SCA)
    - Inpatient Wards
    - Step Down Units
  - If YES, **proceed to Step 2** and map to a location type of that acuity level using the NHSN 80% Rule for that specific type

* Based on patient mix over last full year

Step 1: Acuity Level

- If NO:
  - Can this patient care area be split into 2 or more locations in NHSN for the purposes of surveillance, also referred to as "virtual locations"?
    - If YES: **Proceed to Step 2** and create locations in NHSN for each of the acuity levels, using the NHSN 80% Rule
    - If NO: Map to a CDC Mixed Acuity location

Decision Tree
Step 1: Acuity Level



Step 2: Type of Service

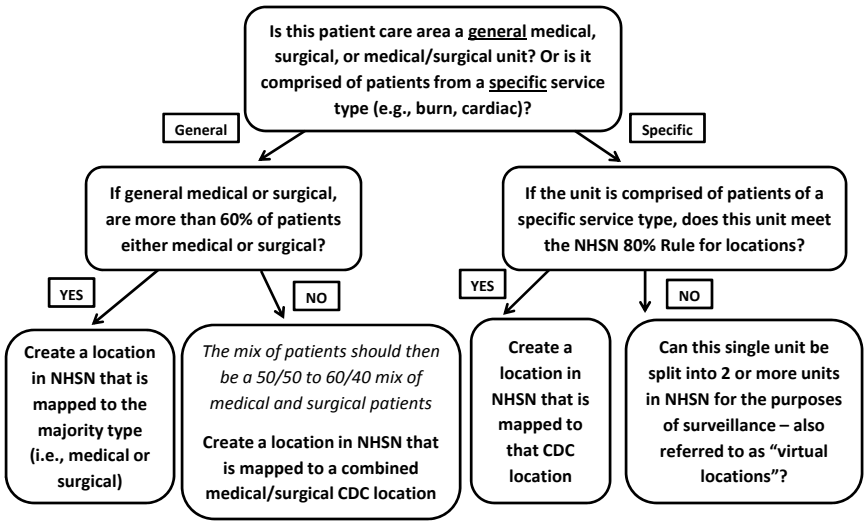
- **Is this patient care area a general medical, surgical, or medical/surgical unit? Or is it comprised of patients from a specific service type (e.g., burn, cardiac)?**

See NHSN Manual, Chapter 15 CDC Location Labels and Location Descriptions @ http://www.cdc.gov/nhsn/TOC_PSCManual.html

Step 2: Type of Service

- **If GENERAL: Are more than 60% of patients either medical or surgical?**
  - If YES: Create a location in NHSN that is mapped to the majority type (medical or surgical)
  - If NO: Create a location in NHSN that is mapped to a combined medical/surgical CDC location
    - The mix of patients should then be a 50/50 to 60/40 mix of medical and surgical patients

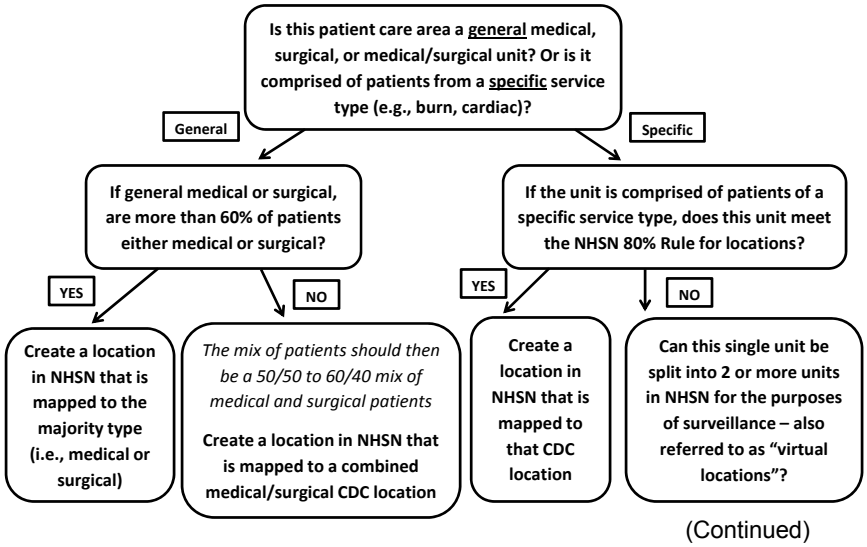
Decision Tree
Step 2: Type of Service



Step 2: Type of Service

- **If SPECIFIC: Does this unit meet the NHSN 80% Rule for locations?**
  - If YES: Create a location in NHSN that is mapped to that location type
  - If NO: Can this single unit be split into 2 or more units in NHSN for the purposes of surveillance, also referred to as "virtual locations"?

Decision Tree
Step 2: Type of Service



(Continued)

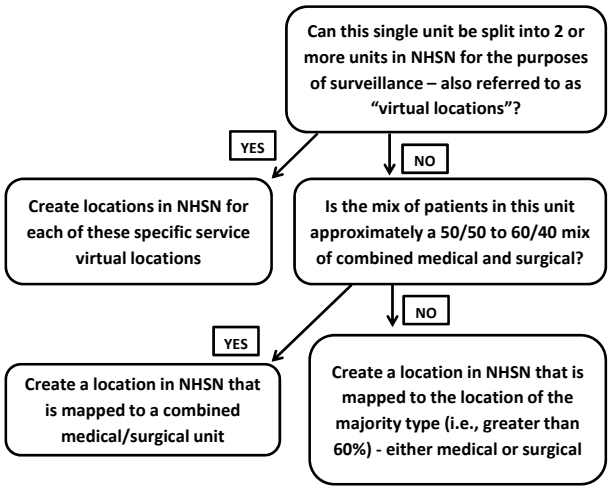
Step 2: Type of Service

- Can this single unit be split into 2 or more units in NHSN for the purposes of surveillance, also referred to as "virtual locations"?
  - If YES: Create locations in NHSN for each of these specific service virtual locations
  - If NO: Is the mix of patients in this unit approximately a 50/50 to 60/40 mix of combined medical and surgical?

Step 2: Type of Service

- Is the mix of patients in this unit approximately a 50/50 to 60/40 mix of combined medical and surgical?
  - If YES: Create a location in NHSN that is mapped to a combined medical/surgical unit
  - If NO: Create a location in NHSN that is mapped to the location of the majority type (greater than 60%), either medical or surgical

Decision Tree
Step 2: Type of Service



Reassess location designations whenever there is a major change in patient types admitted to a location or new locations are added.

Defining a Patient Care Location in NHSN

EXAMPLES

Example 1

- **An ICU that is 40% neurosurgical, 40% surgical, and 20% medical**

Example 1

- An ICU that is 40% neurosurgical, 40% surgical, and 20% medical
- **CDC location:**
  - Option 1: Single CDC location
    - **Surgical Critical Care (IN:ACUTE:CC:S)**
  - Why?
    - Meets 80% Rule for critical care acuity level and does not meet the 80% Rule for a specific service level alone, but when surgical patients are combined, that total does equal 80%

Example 1

- An ICU that is 40% neurosurgical, 40% surgical, and 20% medical
- **CDC location:**
  - Option 2: Multiple CDC Virtual locations
    - **Neurosurgical Critical Care and Surgical Critical Care**
  - Why?
    - By splitting this unit into 2 virtual locations, each meets the 80% Rule for critical care acuity level and one meets the 80% Rule for designation as Neurosurgical Critical Care, while the other meets the 60% Rule as general surgical service (when combining surgical and medical patients)

Example 2

- **A unit that is comprised of 60% medical ICU and 40% step down patients**

Example 2

- A unit that is comprised of 60% medical ICU and 40% step down patients
- **CDC location:**
  - Option 1: Single CDC Location
    - **Mixed Acuity Unit**

Example 2

- A unit that is comprised of 60% medical ICU and 40% step down patients
  - Option 1: **Mixed Acuity Unit**
  - Why?
    - This location is not comprised of at least 80% of patients of the same acuity level and therefore meets the single location definition of a mixed acuity unit
  - NOTE: This location is not considered an ICU location type for the purposes of NHSN reporting and therefore would not be included in any ICU-specific reporting requirements

Example 2

- A unit that is comprised of 60% medical ICU and 40% step down patients
- **CDC location:**
  - Option 2: Multiple CDC virtual locations
    - **Medical Critical Care and Step-Down Unit**
  - Why?
    - By splitting this unit into 2 virtual locations, each meets the 80% Rule for the appropriate acuity level and each meets the 80% Rule for type of service

Resources

- ***Defining Patient Care Locations in NHSN***
  - Decision-making tool with decision tree
  - **In your Resource Book**
- ***CDC Location Labels and Location Descriptions***
  - Provides definitions of each CDC location used for NHSN surveillance
  - http://www.cdc.gov/nhsn/PDFs/pscManual/15LocationsDescriptions_current.pdf

Help with Mapping

- **If you're having trouble mapping a unit in your facility to a CDC location using the 2-step "decision tree":**
  - Email nhsn@cdc.gov
  - Include location bedsize and details of the patient mix (e.g., acuity level, % of patients in each service)

Thank you!

Please place tab here with the number and title 16. Ventilator-Associated Events.
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Ventilator-Associated Events: Background, Definitions and Surveillance Methods

Shelley S. Magill, MD, PhD
October 4, 2012

Overview: the Who, What, When, Why and How of VAE (not necessarily in that order)

- **Why "Ventilator-Associated Events" (VAE)?**
  - Background and rationale for VAE surveillance
- **Who is eligible for VAE surveillance, and when will it be available in the NHSN application?**
- **What is VAE?**
  - Surveillance definitions
- **How do I prepare for and conduct VAE surveillance, and what key terms do I need to know?**
  - Pearls and pitfalls of VAE surveillance
  - Denominators and VAE rate calculations
  - Tools
  - Take-home points

WHY VAE?
BACKGROUND AND RATIONALE

The Problem

- **Ventilator-associated pneumonia (VAP) is an important complication of mechanical ventilation**
  - But other bad things also happen to patients on ventilators
- **No valid, reliable definition for VAP**
  - Need more accurate diagnostics …
  - Until those are available, how do we conduct surveillance and track prevention progress?
- **Commonly used definitions include subjective elements and are neither sensitive nor specific for VAP**
  - Not ideal in an era of public reporting of healthcare-associated infection (HAI) rates, comparisons among facilities, pay-for-performance programs
- **Need a new approach**

NHSN Pneumonia (PNEU) Surveillance Definitions

- **Combination of x-ray, signs/symptoms and laboratory criteria**
  - Three sets of criteria: PNU1, PNU2, PNU3
    - Extra sets of "alternate" PNU1 criteria for children (>1 or ≤12 years) and infants (≤1 year)
  - Chest imaging findings are required
  - Signs and symptoms of pneumonia are required
  - Laboratory evidence is optional—but should be used if available
- **To be "ventilator-associated" —**
  - Endotracheal tube (ETT)/ventilator must have been in place at some time during the 48 hours preceding or at time of PNEU onset
  - No required amount of time that the ETT/ventilator must have been in place for a PNEU to count as a VAP

*See NHSN Manual: Patient Safety Component Protocol, http://www.cdc.gov/nhsn/TOC_PSCManual.html, updated January 2012

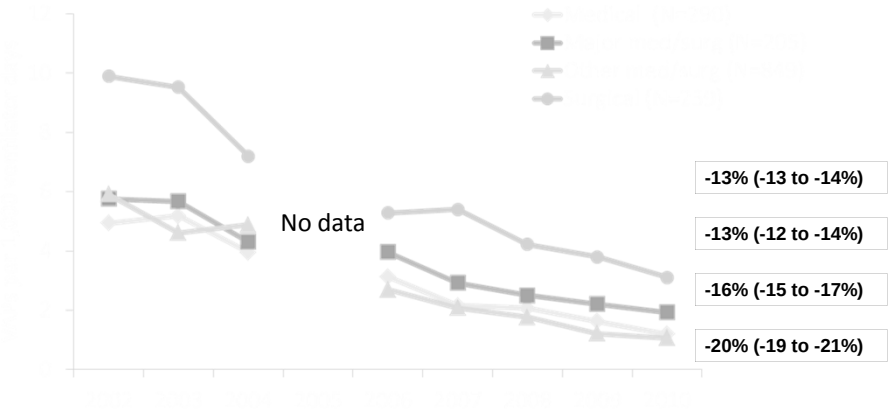
Limitations of Current VAP Definitions

- **Current definitions (e.g., definitions used for surveillance in NHSN, Clinical Pulmonary Infection Score, European surveillance definitions, etc.) all use combinations of criteria:**
- **Chest x-ray** ⟹
  - **Lack specificity for VAP[1]**
  - **Interobserver variability[2]**
  - **Not within purview of IP expertise**
- **Clinical signs/symptoms** ⟹
  - **Lack sensitivity and specificity[3]**
  - **Some are highly subjective**
  - **Documentation varies**
- **Microbiological evidence** ⟹
  - **Lack sensitivity and specificity[4]**
  - **Practices vary among providers**
  - **Controversy about best practices[5,6]**

References include but are not limited to the following:

[1]Wunderink R, et al., Chest 1992;101;458-63; [2]Young M, et al., Arch Intern Med 1994;154:2729-32; [3]Fabregas N, et al., Thorax 1999;54:867-73; [4]Kirtland SH, et al., Chest 1997;112:445-57; [5]Berton DC, et al., Cochrane Database Syst Rev 2008; [6]Ruiz M, et al., Am J Respir Crit Care Med 2000;162:119-25.

VAP Incidence Rates—All Reporting Facilities*



*Preliminary, unpublished, subject to change. Abstract available at: http://shea.confex.com/shea/2010/webprogram/Paper1745.html. Abstract includes Surgical, Medical/Surgical and Medical ICUs only, and data through 2008. Analysis updated since abstract submission to include data through 2010.

Why are VAP incidence rates declining?

- **Evidence-based prevention measures**
- **Other reasons—several ways to lower VAP rates without improving patient care (Klompas et al., AJIC 2012;40:408-10)**
  - Strict interpretation of clinical signs included in surveillance definitions
  - Strict interpretation of chest x-ray findings included in surveillance definitions
  - Requirement for conservative approach to VAP determinations or physician approval of cases
  - Practice of transferring out those patients needing prolonged mechanical ventilation
  - Admission of uncomplicated, intubated post-operative patients to unit

Decrease # of VAPs

Increase # of vent days

Goals for Modifying Current NHSN Definitions

- **Achieve face validity/clinical credibility**
- **Improve reliability**
- **Reduce burden**

From VAP to VAE

Ventilator-Associated LOwer Respiratory Infection (VALORI) ⇨ **Streamlined VAP ("sVAP")** ⇨ **Ventilator-Associated Events (VAE)**

2009-2010

- Evaluated draft definition in collaboration with the CDC Prevention Epicenters
  - Definition based on work done by Klompas and others[1,2]
- Received expert feedback during HHS-sponsored meetings

2011

- Funded Epicenters proposal to evaluate feasibility and preventability of "sVAP"

2011-2012

- Convened VAP Surveillance Definition Working Group, with Critical Care Societies Collaborative and other society/organization representatives (2011-2012)

[1]Klompas et al., Infect Control Hosp Epidemiol 2008;29:31-7; [2]Klompas et al., 5th Decennial International Conference on Healthcare-Associated Infections, Atlanta, GA, March 18-22, 2010, abstract #741.

Adult VAP/VAE Surveillance Definitions Working Group Members and Participants

Society/Organization	Working Group Member
American Association of Critical-Care Nurses	Suzanne Burns, Beth Hammer
American Association for Respiratory Care	Dean Hess
American College of Chest Physicians	Robert Balk, David Gutterman
Association of Professionals in Infection Control and Epidemiology	Linda Greene
American Thoracic Society	Nicholas Hill, Mitchell Levy
Council of State and Territorial Epidemiologists	Carole VanAntwerpen
HICPAC Surveillance Working Group	Daniel Diekema
Infectious Diseases Society of America	Edward Septimus
Society of Critical Care Medicine	Clifford Deutschman, Marin Kollef, Pamela Lipsett
Society for Healthcare Epidemiology of America	Michael Klompas
U.S. Department of Health and Human Services/Office of Healthcare Quality	Don Wright
National Institutes of Health	David Henderson

VAE Surveillance Definition Algorithm—Tiered Approach

- **Tiers 1 and 2: Definitions suitable for potential use in public reporting**
  - Objective, general measures of Ventilator-Associated Conditions (VAC) and Infection-related, Ventilator-Associated Complications (IVAC)
  - Definitions similar to Tier 1 VAC definition evaluated by Klompas et al. identified events associated with longer duration of mechanical ventilation, longer ICU stay, and increased mortality—and were more efficient to apply than current VAP definitions *(PLoS One 2011;6:e18062, Crit Care Med 2012; in press)*
- **Tier 3: Internal use definitions**
  - Possible VAP and Probable VAP, incorporating laboratory evidence

******Note that this is NOT a clinical definition algorithm and is not intended for use in the management of patients.******

THE "WHO" AND "WHEN" OF VAE SURVEILLANCE

Who is eligible for VAE surveillance?

- ≥18 years of age
- Inpatients of acute care hospitals, long term acute care hospitals, inpatient rehabilitation facilities

Who is NOT eligible for VAE surveillance?

- Children are not eligible.
- Inpatients of facilities other than acute care hospitals, long-term acute care hospitals and inpatient rehabilitation facilities are not eligible.
- Patients on high frequency ventilation or extracorporeal life support are NOT ELIGIBLE for VAE surveillance.

What about patients receiving other types of life support or alternative modes of mechanical ventilation?

- Patients on high frequency ventilation or extracorporeal life support are EXCLUDED from VAE surveillance.
- Patients who are receiving a conventional mode of mechanical ventilation while in the prone position, and patients who are receiving a conventional mode of mechanical ventilation while receiving nitric oxide therapy or epoprostenol therapy are INCLUDED.
- Patients on Airway Pressure Release Ventilation (APRV) or related modes are INCLUDED, but VAC will be determined by changes in FiO_2 only, since changes in PEEP as indicated in this surveillance algorithm may not be applicable to APRV.

If you have questions about mechanical ventilation, check with the Respiratory Care or Respiratory Therapy and/or Critical Care departments in your facility.

When will VAE surveillance be available in NHSN, and what is happening to PNEU/VAP?

- **VAE available January 2013.**
- **In 2013, current VAP protocol will still be used for neonatal and pediatric patients ONLY.**
  - Pediatric and Neonatal VAE Surveillance Definition Working Group kick-off meeting held on September 6, 2012
- **In 2013, the current PNEU definitions will still be available for off-plan surveillance of VAP in adults or non-ventilated PNEU in adults or children.**

"WHAT" IS VAE?
REVIEW OF DEFINITIONS

****Note that these are NOT clinical definitions and are not intended for use in the management of patients.****

VAE Definition Algorithm Summary

- Respiratory status component
- Infection / inflammation component
- Additional evidence

Patient on mechanical ventilation > 2 days

No CXR needed!

Baseline period of stability or improvement, followed by sustained period of worsening oxygenation

Ventilator-Associated Condition (VAC)

General evidence of infection/inflammation

Infection-Related Ventilator-Associated Complication (IVAC)

Positive results of microbiological testing

Possible or Probable VAP

VAE Definition Algorithm Summary

- Respiratory status component
- Infection / inflammation component
- Additional evidence

Patient on mechanical ventilation > 2 days

Baseline period of stability or improvement, followed by sustained period of worsening oxygenation

FiO_2 or PEEP

Ventilator-Associated Condition (VAC)

General evidence of infection/inflammation

Infection-Related Ventilator-Associated Complication (IVAC)

Positive results of microbiological testing

Possible or Probable VAP

VAE Definition Algorithm Summary

- Respiratory status component
  - Patient on mechanical ventilation > 2 days
  - Baseline period of stability or improvement, followed by sustained period of worsening oxygen
- Ventilator-Associated Condition (VA
- Infection / inflammation component
  - General evidence of infection/inflammation
- Infection-Related Ventilator-Associated Complication (IVAC)
- Additional evidence
  - Positive results of microbiological testing
- Possible or Probable VAP

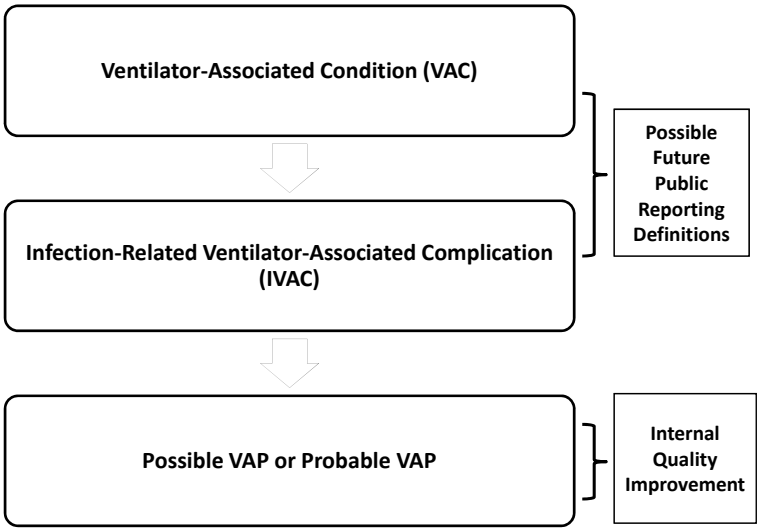
Temperature or WBC
and
New antimicrobial agent

VAE Definition Algorithm Summary

- Respiratory status component
  - Patient on mechanical ventilation > 2 days
  - Baseline period of stability or improvement, followed by sustained period of worsening oxygenation
- Ventilator-Associated Condition (VAC)
- Infection / inflammation component
  - General evidence of infection/inflamma
- Infection-Related Ventilator-Associated Com (IVAC)
- Additional evidence
  - Positive results of microbiological testing
- Possible or Probable VAP

Purulent secretions and/or other positive laboratory evidence

VAE Definition Algorithm Summary



Tier 1: VAC

Patient has a baseline period of stability or improvement on the ventilator, defined by ≥ 2 calendar days of stable or decreasing daily minimum FiO_2 or PEEP values. The baseline period is defined as the two calendar days immediately preceding the first day of increased daily minimum PEEP or FiO_2.

AND

After a period of stability or improvement on the ventilator, the patient has at least one of the following indicators of worsening oxygenation:

1) Increase in daily minimum FiO_2 of ≥ 0.20 (20 points) over the daily minimum FiO_2 in the baseline period, sustained for ≥ 2 calendar days.

2) Increase in daily minimum PEEP values of ≥ 3 cmH_2O over the daily minimum PEEP in the baseline period, sustained for ≥ 2 calendar days.

Tier 2: IVAC

Patient meets criteria for VAC

AND

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, the patient meets both of the following criteria:

1) Temperature > 38 °C or < 36°C, OR white blood cell count ≥ 12,000 cells/mm^3 or ≤ 4,000 cells/mm^3.

AND

2) A new antimicrobial agent(s)* is started, and is continued for ≥ 4 calendar days.

*See Appendix for eligible agents.

Tier 3: Possible VAP

Patient meets criteria for VAC and IVAC

AND

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, ONE of the following criteria is met:

1) Purulent respiratory secretions (from one or more specimen collections)
   - Defined as secretions from the lungs, bronchi, or trachea that contain ≥25 neutrophils and ≤10 squamous epithelial cells per low power field [lpf, x100].
   - If the laboratory reports semi-quantitative results, those results must be equivalent to the above quantitative thresholds.

2) Positive culture (qualitative, semi-quantitative or quantitative) of sputum*, endotracheal aspirate*, bronchoalveolar lavage*, lung tissue, or protected specimen brushing*

Excludes the following:

- Normal respiratory/oral flora, mixed respiratory/oral flora or equivalent
- *Candida* species or yeast not otherwise specified
- Coagulase-negative *Staphylococcus* species
- *Enterococcus* species

Tier 3: Probable VAP

VAC, IVAC plus the following…

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, ONE of the following criteria is met:

1) Purulent respiratory secretions (from one or more specimen collections—and defined as for possible VAP)

AND one of the following (see Table 2):

- Positive culture of endotracheal aspirate*, ≥ 10^5 CFU/ml or equivalent semi-quantitative result
- Positive culture of bronchoalveolar lavage*, ≥ 10^4 CFU/ml or equivalent semi-quantitative result
- Positive culture of lung tissue, ≥ 10^4 CFU/g or equivalent semi-quantitative result
- Positive culture of protected specimen brush*, ≥ 10^3 CFU/ml or equivalent semi-quantitative result

**Same organism exclusions as noted for Possible VAP.*

2) One of the following (without requirement for purulent respiratory secretions):

- Positive pleural fluid culture (where specimen was obtained during thoracentesis or initial placement of chest tube and NOT from an indwelling chest tube)
- Positive lung histopathology
- Positive diagnostic test for *Legionella* spp.
- Positive diagnostic test on respiratory secretions for influenza virus, respiratory syncytial virus, adenovirus, parainfluenza virus, rhinovirus, human metapneumovirus, coronavirus

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* Location of Mechanical Ventilation Initiation: _____ *Date Initiated: __/__/____ *APRV: Yes No

Event Details

*Specific Event: ☐ VAC ☐ IVAC ☐ Possible VAP ☐ Probable VAP

*Specify Criteria Used:

STEP 1: VAC (≥1 REQUIRED)

☐ Daily min FiO_2 increase ≥ 0.20 (20 points) for ≥ 2 days† **OR** ☐ Daily min PEEP increase ≥ 3 cm H_2O for ≥ 2 days†

†*after 2+ days of stable or decreasing daily minimum values.*

STEP 2: IVAC

☐ Temperature > 38°C or < 36° **OR** ☐ White blood cell count ≥ 12,000 or ≤ 4,000 cells/mm^3

AND

☐ A new antimicrobial agent(s) is started, and is continued for ≥ 4 days

STEP 3: Possible VAP

☐ Purulent respiratory secretions‡ (defined as secretions from the lungs, bronchi, or trachea that contain ≥25 neutrophils and ≤10 squamous epithelial cells per low power field [lpf, x100], or equivalent semi-quantitative results)

OR

☐ One of the following (qualitative, semi-quantitative or quantitative):‡

- ☐ Positive culture of sputum
- ☐ Positive culture of endotracheal aspirate
- ☐ Positive culture of bronchoalveolar lavage
- ☐ Positive culture of lung tissue
- ☐ Positive culture of protected specimen brushing

STEP 3: Probable VAP

☐ Purulent respiratory secretions‡ **AND** one of the following (meeting quantitative or semi-quantitative threshold as outlined in protocol):‡

- ☐ Positive culture of endotracheal aspirate
- ☐ Positive culture of bronchoalveolar lavage
- ☐ Positive culture of lung tissue
- ☐ Positive culture of protected specimen brushing

OR

☐ One of the following results(without requirement for purulent respiratory secretions), as outlined in protocol:‡

- ☐ Positive pleural fluid culture
- ☐ Positive lung histopathology
- ☐ Positive diagnostic test for Legionella spp.
- ☐ Positive diagnostic test for viral pathogens

‡*collected after 2 days of mechanical ventilation and within +/- 2 days of onset of increase in FiO_2 or PEEP.*

Do I have to use the entire algorithm? Can I decide to conduct surveillance only for IVAC, for example?

- **Conducting in-plan VAE surveillance in 2013 requires assessing patients for ALL events:**
  - VAC
  - IVAC
  - Possible or Probable VAP
- **Hierarchy of definitions:**
  - If a patient meets criteria for VAC and IVAC, report as IVAC.
  - If a patient meets criteria for VAC, IVAC and Possible VAP, report Possible VAP.
  - If a patient meets criteria for VAC, IVAC and Probable VAP, report Probable VAP.
  - If a patient meets criteria for VAC, IVAC, Possible VAP and Probable VAP, report Probable VAP.

HOW TO PREPARE FOR AND CONDUCT VAE SURVEILLANCE, AND KEY TERMS

Preparing for VAE Surveillance

- **Read the surveillance protocol.**
  - http://www.cdc.gov/nhsn/psc_da-vae.html
- **Identify surveillance partners in the ICU or other units in which VAE surveillance may take place.**
  - Respiratory Therapy
  - Critical Care
- **If hospital laboratory reports Gram stain or culture results in a semi-quantitative way, find out from the lab what quantitative ranges correspond to the semi-quantitative scale (for Possible/Probable VAP).**
- **Develop a plan for organizing the data elements needed to identify VAEs.**

Example: Operationalizing VAE

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1										
2										
3										
4										
5										
6										
7										
8										

Ventilator Definition

- **Ventilator is defined as a device to assist or control respiration continuously, inclusive of the weaning period, through a tracheostomy or by endotracheal intubation**
  - Intermittent positive-pressure breathing (IPPB); nasal positive end-expiratory pressure (nasal PEEP); and continuous nasal positive airway pressure (CPAP, hypoCPAP) are not considered ventilators unless delivered via tracheostomy or endotracheal intubation (e.g., ET-CPAP)

No change from current NHSN ventilator definition

Episode of Mechanical Ventilation

- **A period of days during which the patient was mechanically ventilated for some portion of each consecutive day. A break in mechanical ventilation of at least one full calendar day followed by reintubation and reinitiation of mechanical ventilation during the same hospitalization is a new episode.**

Positive End-Expiratory Pressure (PEEP)

- **"A technique used in respiratory therapy in which airway pressure greater than atmospheric pressure is achieved at the end of exhalation by the introduction of a mechanical impedance to exhalation."***
- **In patients on conventional mechanical ventilation, PEEP is one of the parameters that can be adjusted depending on the patient's oxygenation needs.**
- **A sustained increase in the daily minimum PEEP of ≥ 3 cmH_2O following a period of stability or improvement on the ventilator is one of two criteria that can be used in meeting the VAC definition.**

*Stedman's Medical Dictionary, (28th ed). (2005). Philadelphia: Lippincott, Williams, & Wilkins.

Fraction of Inspired Oxygen (FiO_2)

- **The fraction of oxygen in inspired gas.**
  - For example, the FiO_2 of ambient air is 0.21; the oxygen concentration of ambient air is 21%.
- **In patients on mechanical ventilation, the FiO_2 is one of the key parameters that can be adjusted depending on the patient's oxygenation needs.**
- **A sustained increase in the daily minimum FiO_2 of ≥ 0.20 (20%) following a period of stability or improvement on the ventilator is the second of the two criteria that can be used in meeting the VAC definition.**

Tier 1: VAC

Patient has a baseline period of stability or improvement on the ventilator, defined by ≥ 2 calendar days of stable or decreasing daily minimum FiO_2 or PEEP values. The baseline period is defined as the two calendar days immediately preceding the first day of increased daily minimum PEEP or FiO_2.

AND

After a period of stability or improvement on the ventilator, the patient has at least one of the following indicators of worsening oxygenation:

1) Increase in daily minimum FiO_2 of ≥ 0.20 (20 points) over the daily minimum FiO_2 in the baseline period, sustained for ≥ 2 calendar days.

2) Increase in daily minimum PEEP values of ≥ 3 cmH_2O over the daily minimum PEEP in the baseline period, sustained for ≥ 2 calendar days.

Example: Operationalizing VAE

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1										
2										
3										
4										
5										
6										
7										
8										

Operationalizing VAE

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	40								
4	8	60								
5	8	50								
6	7	40								
7	5	40								
8	5	40								

2-day period of stability (PEEP or FiO_2)

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	40								
4	8	60								
5	8	50								
6	7	40								
7	5	40								
8	5	40								

2-day period of worsening, based on PEEP or FiO_2

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	[illegible]								
4	8	60								
5	8	50								
6	7	40								
7	5	40								
8	5	40								

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	[illegible]								
4	8	60								
5	8	50								
6	7	40								
7	5	40								
8	5	40								

= VAC

Date of Event / Event Date

- **The date of onset of worsening oxygenation (day 1 of the required ≥ 2 day period of worsening oxygenation).** ***It is <u>not</u> the date in which all VAE criteria are met.***

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Poly/Epis	Org
1	10	60								
2	5	40								
3	5	40								
4	8									
5	8	50								
6	7	40								
7	5	40								
8	5	40								

Event Date = Vent Day 4 (first day of worsening oxygenation)

Why is the Event Date important?

- **Defining the "VAE Window Period"**
  - Period during which criteria for other events—IVAC, Possible, Probable VAP—must be met
- **Detecting multiple VAEs in the same patient**
  - Each VAE is 14 days in duration (arbitrary—to standardize).
  - Day 1 is the Event Date—so if June 1 is date of onset of worsening oxygenation and a VAC is reported, a second VAE cannot be detected and reported until June 15.
  - May not "upgrade" a VAE based on data collected outside the VAE Window Period but within the 14-day event period.
  - May not report a new VAE until that 14 day period has elapsed (keep in mind that 14 day period is event date to event date—so baseline period can occur during previous event period).

VAE Window Period

- **This is the period of days around the event date (i.e., the day of onset of worsening oxygenation) within which other VAE criteria must be met. It is usually a 5-day period and includes the 2 days before, the day of, and the 2 days after the VAE event date (i.e., the first day of worsening oxygenation, the day of VAE onset).**

VAE Window Period

Event Date

2 days before Event Date

2 days after Event Date

MV Day No.	10	11	12	13	14	15	16
VAE Day	-3	-2	-1	1	2	3	4
Worsening oxygenation	--	Day 1 of Stability or improve-ment	Day 2 of stability or improve-ment	Day 1 of worsening oxygena-tion	Day 2 of worsening oxygena-tion		
Temperature or WBC abnormality		←Documented within this shaded period→					
Antimicrobial agent		←Started on within this shaded period, and then continued for at least 4 days→					
Purulent respiratory secretions, positive culture, positive histopathology		←Collected within this shaded period→					

VAE Window Period: Important Note

- **There is an exception, however, in which the VAE Window Period is only 3 or 4 days, as follows:**

In cases where the VAE event date corresponds to MV day 3 or day 4, the window period described above may only be a 3-day or a 4-day window, because it can NOT include any days before the 3rd day of MV. For example, if the VAE event date is MV day 3, then the window period includes only the day of VAE onset and the 2 days after VAE onset (because the 2 days before VAE onset are before the 3rd day of MV).

Exception: VAE Window Period

When the event occurs early in course of mechanical ventilation

Can't count data in 1st 2 days of MV for IVAC, Poss/Prob VAP

Event Date

2 days after Event Date

MV Day No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
VAE Day	-2	-1	1	2	3	4	5
Worsening oxygenation	Day 1 of Stability or improve-ment	Day 2 of stability or improve-ment	Day 1 of worsening oxygena-tion	Day 2 of worsening oxygena-tion			
Temperature or WBC abnormality			←Documented within this shaded period→				
Antimicrobial agent			←Started on within this shaded period, and then continued for at least 4 days→				
Purulent respiratory secretions, positive culture, positive histopathology			←Collected within this shaded period→				

Infection-related Ventilator-Associated Complication (IVAC)

Patient meets criteria for VAC

AND

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, the patient meets <u>both</u> of the following criteria:

1) Temperature > 38 °C or < 36°C, OR white blood cell count ≥ 12,000 cells/mm^3 or ≤ 4,000 cells/mm^3.

AND

2) A new antimicrobial agent(s)* is started, and is continued for ≥ 4 calendar days.

*See Appendix for eligible agents.

Defining the VAE Window Period

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	[illegible]	Org
1	10	60								
2	5	40								
3	5	40								
4	8	[illegible]								
5	8	50								
6	7	[illegible]								
7	[illegible]	40								
[illegible]	5	40								

2-day period [illegible] set of worsening

[illegible] nt Date, day 1 of worsening

2-day period after onset of worsening

What's wrong with this VAE Window Period?

Defining the VAE Window

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	40								
4	8	60								
5	8	50								
6	7	40								
7	5	40								
8	5	40								

In this case—there is <u>only 1 day</u> before onset of worsening (because <u>cannot count 1st 2 days of MV</u>)

Event Date, day 1 of worsening

2-day period after onset of worsening

Look for abnormal temp or white count during VAE Window Period

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40								
3	5	40	36.9	37.6	12.1	12.1				
4	8	60	38.1	39.2	14.5	16.8				
5	8	50	38.4	38.9	12.6	15.9				
6	7	40	36.5	37.8	11.1	13.6				
7	5	40								
8	5	40								

Infection-related Ventilator-Associated Complication (IVAC)

Patient meets criteria for VAC

AND

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, the patient meets both of the following criteria:

1) Temperature > 38 °C or < 36°C, OR white blood cell count ≥ 12,000 cells/mm^3 or ≤ 4,000 cells/mm^3.

AND

2) A new antimicrobial agent(s)* is started, and is continued for ≥ 4 calendar days.

*See Appendix for eligible agents.

IVAC Antimicrobial Criterion

- **Probably the most complicated portion of the VAE surveillance definition algorithm**
- **Rules for meeting this criterion are not perfect—but we need a standardized method for assessment of antimicrobial therapy, without needing knowledge of dosing, renal function, indication for therapy, etc.**

Figuring out if a "new" antimicrobial agent(s) has been given

- **New antimicrobial agent: Defined as any agent listed in the protocol Appendix that is initiated on or after the third calendar day of mechanical ventilation AND in the VAE Window Period (i.e., the period typically defined by the 2 calendar days before, the day of, and the 2 calendar days after the onset date of the VAE).**
  - The agent is considered new for the purposes of this definition if it was NOT given to the patient on either of the 2 days preceding the current start date.
  - A new agent must be continued for ≥ 4 consecutive days.
  - There is no requirement that the same antimicrobial agent be given on the 4 consecutive days.
  - New agent must be administered IV, IM, via digestive tract or via respiratory tract

What antimicrobial drugs are in the Appendix?

- **Go to page 20 of the protocol.**
- **Broad range of agents that could be used to treat healthcare-associated infections—mostly antibacterials, antifungals, limited antivirals**
  - Including agents that are not used to treat respiratory infections (e.g., oral vancomycin, fidaxomicin)
  - To emphasize that an "IVAC" does not mean that the "infection related" event is respiratory in origin
- **Drugs that are not included = anti-HIV agents, anti-TB agents, agents used to treat viral hepatitis, agents used to treat herpes virus infections, anti-parasitics**

Figuring out if ≥4 days of therapy have been given: Qualifying Antimicrobial Days (QAD)

- **A day on which the patient was administered an antimicrobial agent that was determined to be "new" within the VAE Window Period.**
- **Four consecutive QADs are needed to meet the IVAC antimicrobial criterion—starting within the VAE Window Period.**

QADs: Same Agent

- **Days between administrations of a new antimicrobial agent also count as QADs as long as there is a gap of <u>no more than 1 calendar day</u> between administrations of the <u>same drug</u>. For example, if levofloxacin is given on VAE Day 1, has not been given in the 2 preceding calendar days, and is given again on VAE Days 3, 5 and 7, there are 7 QADs—because the days between levofloxacin doses also count as QADs.**

Same agent, given every other day = 7 consecutive QADs

VAE Day	-2	-1	1	2	3	4	5	6	7
Abx	--	--	**Levo**	--	**Levo**	--	**Levo**	--	**Levo**
QAD	--	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes

QADs: Different Agents

- **By contrast, days between administrations of different antimicrobial agents do NOT count as QADs**
  - For example, if levofloxacin is given to the patient on VAE Days -2 and -1 only, no antimicrobials are given on VAE Day 1, and meropenem is given only on VAE Day 2 (remember there is no VAE Day 0), then there are <u>not</u> 4 consecutive QADs. VAE Days -2 and -1 count as 2 consecutive QADs, but VAE Day 1 cannot be counted as a QAD because it is a day between different antimicrobial agents.

Different agents, with gap between agents: only 2 consecutive QADs

VAE Day	-4	-3	-2	-1	1	2	3	4	5
Abx #1	--	--	**Levo**	**Levo**	--	--	--	--	--
Abx #2	--	--	--	--	--	**Mero**	--	--	--
QAD	--	--	Yes	Yes	--	Yes	--	--	--

New antimicrobial agent started and continued for 4 days

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Poly/Epis	Org
1	10	60					None			
2	5	40					None			
3	5	40	36.9	37.6	12.1	12.1	None			
4	8	60	38.1	39.2	14.5	16.8	Yes			
5	8	50	38.4	38.9	12.6	15.9	Yes			
6	7	40	36.5	37.8	11.1	13.6	Yes			
7	5	40					Yes			
8	5	40					Yes			

= IVAC

Possible VAP

Patient meets criteria for VAC and IVAC

AND

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, ONE of the following criteria is met:

1) Purulent respiratory secretions (from one or more specimen collections)
   - Defined as secretions from the lungs, bronchi, or trachea that contain ≥25 neutrophils and ≤10 squamous epithelial cells per low power field [lpf, x100].
   - If the laboratory reports semi-quantitative results, those results must be equivalent to the above quantitative thresholds.

2) Positive culture (qualitative, semi-quantitative or quantitative) of sputum*, endotracheal aspirate*, bronchoalveolar lavage*, lung tissue, or protected specimen brushing*

Excludes the following:
- Normal respiratory/oral flora, mixed respiratory/oral flora or equivalent
- *Candida* species or yeast not otherwise specified
- Coagulase-negative *Staphylococcus* species
- *Enterococcus* species

Probable VAP

VAC, IVAC plus the following…

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, ONE of the following criteria is met:

1) Purulent respiratory secretions (from one or more specimen collections—and defined as for possible VAP)

AND one of the following (see Table 2):

- Positive culture of endotracheal aspirate*, ≥ 10^5 CFU/ml or equivalent semi-quantitative result
- Positive culture of bronchoalveolar lavage*, ≥ 10^4 CFU/ml or equivalent semi-quantitative result
- Positive culture of lung tissue, ≥ 10^4 CFU/g or equivalent semi-quantitative result
- Positive culture of protected specimen brush*, ≥ 10^3 CFU/ml or equivalent semi-quantitative result

**Same organism exclusions as noted for Possible VAP.*

2) One of the following (without requirement for purulent respiratory secretions):

- Positive pleural fluid culture (where specimen was obtained during thoracentesis or initial placement of chest tube and NOT from an indwelling chest tube)
- Positive lung histopathology
- Positive diagnostic test for *Legionella* spp.
- Positive diagnostic test on respiratory secretions for influenza virus, respiratory syncytial virus, adenovirus, parainfluenza virus, rhinovirus, human metapneumovirus, coronavirus

Purulent Respiratory Secretions

- **Gram stain polymorphonuclear leukocyte ("polys", "PMN", neutrophil) counts and squamous epithelial cell counts**
- **Can be used alone to meet Possible VAP definition, or in combination with a semi-quantitative or quantitative culture result (with the appropriate growth) to meet the Probable VAP definition**

How do I relate my lab's semi-quantitative Gram stain reporting to the quantitative thresholds in the algorithm?

- **Ask your laboratory manager/director first—he/she may be able to tell you**
- **If your laboratory does not have this information, we are working to provide guidance on this issue* …**

  1+ = occasional or rare = <1 cell per low power field (lpf)
  2+ = few = 1-9 cells per lpf
  3+ = moderate = 10-25 cells per lpf
  4+ = heavy = >25 cells per lpf

  - This means that in the absence of information from your lab, "purulent respiratory secretions" are defined by "heavy", 4+ or ≥25 neutrophils per low power field AND "rare", "occasional", "few", 1+ or 2+, or ≤10 squamous epithelial cells per lpf
  - *This is preliminary! Please make sure to review the protocol in 2013 for updates.*

*Reference: Garcia, LS (Ed.). (2010). Clinical Microbiology Procedures Handbook. Herndon, VA: ASM Press, page 3.2.1.16.

Lower Respiratory Culture Results

- **Appropriate specimen types include:**
  - Sputum, endotracheal aspirate, bronchoalveolar lavage, protected specimen brushings, lung tissue, pleural fluid
- **Exclude the following as a pathogen unless isolated from lung tissue or pleural fluid**
  - *Candida* species or yeast not otherwise specified
  - Coagulase negative *Staphylococcus* species
  - *Enterococcus* species
- **Exclude the following culture results (or similar) …**
  - Normal respiratory flora / Normal oral flora
  - Mixed respiratory flora / Mixed oral flora
  - Altered oral / respiratory flora

Positive Culture Result Reporting

- **Qualitative**
  - Identification of organism with no quantity assigned
  - Example: "Organism 1: *Staphylococcus aureus"*
- **Semi-quantitative**
  - Identification of organism with estimated quantity
  - Example: 1+, 2+, 3+, 4+
  - Example: Rare, Few, Moderate , Heavy
- **Quantitative**
  - Identification of organism with exact quantity expressed
  - Example: 10^4 cfu/ml (colony forming units/milliliter)

How do I relate my lab's semi-quantitative culture result reporting to the quantitative thresholds in the algorithm?

- **Ask your laboratory manager/director first—she/he may be able to tell you**
- **If your laboratory does not have this information, we are working to provide guidance on this issue* …**
  - For the purposes of this surveillance, we will assume that a semi-quantitative result of "moderate" or "heavy" growth, or 2+, 3+ or 4+ growth (in a culture of lung tissue, BAL, PSB, or ETA) meets the Probable VAP surveillance definition.
  - *This is preliminary! Please make sure to review the protocol in 2013 for updates.*

*Reference: Garcia, LS (Ed.). (2010). Clinical Microbiology Procedures Handbook. Herndon, VA: ASM Press, page 3.2.1.16.

Non-Culture-Based Results: Probable VAP

- **Pathogens (*Legionella* spp., selected viruses) identified utilizing non-culture-based diagnostic testing may qualify as criterion for meeting Probable VAP.**
  - Antigen testing
  - PCR
  - Direct Fluorescent Antibody Testing
  - Serology
- **Many other pathogens (including respiratory pathogens such as *Mycoplasma* and *Chlamydophila*) that may be detected using non-culture-based techniques are <u>not</u> currently included in Probable VAP criteria.**

Histopathology (Lung) Results

- **Identification of abscess formation or foci of consolidation with intense neutrophil accumulation in bronchioles and alveoli**
- **Evidence of lung parenchyma invasion by fungi (hyphae, pseudohyphae or yeast forms)**
- **Evidence of infection with viral pathogens (immunohistochemical assays, cytology, microscopy)**

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys/ Epis	Org
1	10	60								
2	5	40					None			
3	5	40	36.9	37.6	12.1	12.1	None	ETA	>25/ <10	*Staph aureus*
4	8	60	38.1	39.2	14.5	16.8	Yes	--	--	--
5	8	50	38.4	38.9	12.6	15.9	Yes	--	--	--
6	7	40	36.5	37.8	11.1	13.6	Yes	--	--	---
7	5	40					Yes			
8	5	40								

Purulent respiratory secretions OR ETA culture positive for *S. aureus*

= Possible VAP

Probable VAP

VAC, IVAC plus the following…

On or after calendar day 3 of mechanical ventilation and within 2 calendar days before or after the onset of worsening oxygenation, ONE of the following criteria is met:

1) Purulent respiratory secretions (from one or more specimen collections—and defined as for possible VAP)

AND one of the following (see Table 2):

- Positive culture of endotracheal aspirate*, ≥ 10^5 CFU/ml or equivalent semi-quantitative result
- Positive culture of bronchoalveolar lavage*, ≥ 10^4 CFU/ml or equivalent semi-quantitative result
- Positive culture of lung tissue, ≥ 10^4 CFU/g or equivalent semi-quantitative result
- Positive culture of protected specimen brush*, ≥ 10^3 CFU/ml or equivalent semi-quantitative result

**Same organism exclusions as noted for Possible VAP.*

2) One of the following (without requirement for purulent respiratory secretions):

- Positive pleural fluid culture (where specimen was obtained during thoracentesis or initial placement of chest tube and NOT from an indwelling chest tube)
- Positive lung histopathology
- Positive diagnostic test for *Legionella* spp.
- Positive diagnostic test on respiratory secretions for influenza virus, respiratory syncytial virus, adenovirus, parainfluenza virus, rhinovirus, human metapneumovirus, coronavirus

Purulent respiratory secretions AND positive quantitative or semi-quantitative ETA culture *(meeting specified threshold)*

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Spec	Polys /Epis	Org
1	10	60								
2	5	40					None			
3	5	40	36.9	37.6	12.1	12.1	None	ETA	≥25/ ≤10	10^5 cfu/ml *S. aureus*
4	8	60	38.1	39.2	14.5	16.8	Yes	--	--	--
5	8	50	38.4	38.9	12.6	15.9	Yes	--	--	--
6	7	40	36.5	37.8	11.1	13.6	Yes	--	--	---
7	5	40					Yes			

= Probable VAP

Positive pleural fluid, lung histopathology, *Legionella* or viral test result

Vent Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Sp	Polys/ Epis	Org
1	10	60								
2	5	40					None			
3	5	40	36.9	37.6	12.1	12.1	None	Pleural Fluid		*Staph aureus*
4	8	60	38.1	39.2	14.5	16.8	Yes	--	--	--
5	8	50	38.4	38.9	12.6	15.9	Yes	--	--	--
6	7	40	36.5	37.8	11.1	13.6	Yes	--	--	---
7	5	40					Yes			
8	5	40								

= Probable VAP

Pathogen Reporting

- **Pathogens may be reported for Possible VAP and Probable VAP, according to the usual pathogen and antimicrobial susceptibility reporting methods utilized in NHSN for other events.**
  - Exception: excluded pathogens
- **Pathogens are not reported for VAC or for IVAC.**

What about positive blood cultures that occur around the same time as a VAE?

- **Secondary BSI = A culture-confirmed BSI associated with a documented HAI at another site (i.e., meets CDC criteria of infection at another site such as UTI).**
  - If the primary infection is cultured, the Secondary BSI must yield culture of a same organism as the primary HAI site, regardless of antibiogram.

What about positive blood cultures that occur around the same time as a VAE?

- **Secondary BSI may be reported for Possible and Probable VAP.**
  - When at least one organism from the blood culture specimen matches an organism from an appropriate respiratory tract specimen collected during the VAE Window Period
  - And when the blood culture was collected within the 14 day event period
- **Secondary BSI may not be reported for Possible and Probable VAP when a respiratory culture was not performed.**
  - Possible VAP met with purulent respiratory secretions
  - Probable VAP met with histopathology criterion
- **Secondary BSIs are not reported for VAC or IVAC.**

Key Things to Remember about Numerator Data Collection

- **For most patients—will only need to record daily minimum PEEP and FiO_2 while on ventilator. Nothing else!**
- **Only need to assess temperature and white blood cell count information for patients who fulfill VAC criteria**
  - And only need to look at these values during the VAE Window Period (3-5 days)
- **Only need to look at antimicrobial administrations for patients with VAC AND abnormal temp or white count**
  - New during the VAE Window Period (3-5 days)
- **Only need to assess lab/microbiology/pathology data for patients with IVAC**
  - Collected during the VAE Window Period (3-5 days)

Denominator Data

- **Device (ventilator) days and patient days are used for denominators.**
  - Collect data daily at the same time each day.
  - Daily counts are summed and only the total for the month is reported in NHSN.
- **Ventilator days – number of patients in the chosen location who are managed with a ventilatory device**
  - Ventilator days for all patients are counted to include those on ventilator < 3 days, those receiving excluded therapies and pediatric patients housed in adult locations.
  - Number of patients on APRV mode of ventilation or related modes are included in total and also indicated separately.
- **Patient days = number of patients in the chosen location**

Denominator Form

*required for saving
Facility ID: *Location Code: *Month: *Year:

Date	*Number of Patients	**Number of patients with 1 or more **central lines**	**Number of patients with a **urinary catheter**	**Number of patients on a **ventilator**	
				Total Patients	Number on APRV
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Analysis

- **VAE Rate per 1000 ventilator days =**

$$\frac{\text{Number of VAEs}}{\text{Number of Ventilator Days}}$$

- **Ventilator Utilization Ratio =**

$$\frac{\text{Ventilator Days}}{\text{Patient Days}}$$

Remember … Tips for Getting Started

- **Get familiar with the protocol and review FAQs.**
- **Establish relationships with Respiratory Therapy and/or Critical Care:**
  - Discuss options for collection of minimum daily PEEP and FiO_2 for each MV day (IP, RT, electronically generated).
  - May want to ask about frequency with which excluded therapies (HFV, extracorporeal support) are used, and APRV.
- **Determine your laboratory's approach to Gram stain and culture result reporting.**
- **Explore use of tools for data collection and for learning the definitions and making VAE determinations.**

Ventilator-Associated Event Data Collection Tool

PATIENT ID_____

Date	Vent Day	PEEP min	FiO_2 min	Temp		WBC		QAD (✓)	Purulent resp. secretions[a] (✓)	Positive sputum, BAL, PSB, ETA, lung tissue culture[b,c]		Other Positive PrVAP Criteria[d]			VAE (VAC,IVAC, Po/Pr VAP)
				Min [<36°C]	Max [>38°C]	Min [≤4K]	Max [≥12K]			Qual only (✓)	Meets semi-quant or quant criteria (✓)	Pleural fluid (✓)	Path (✓)	*Legionella* or viral diagnostic (✓)	

Abbreviations: PEEP = Positive End-Expiratory Pressure; FiO2 = fraction of inspired oxygen; Min = daily minimum; Max = daily maximum; 4K = ≤4,000 WBC/mm^3; 12K = ≥12,000 WBC/ mm^3; QAD = Qualifying Antimicrobial Day (see Antimicrobial Worksheet or protocol for details); resp = respiratory; BAL = bronchoalveolar lavage; PSB = protected specimen brush; ETA = endotracheal aspirate; qual = qualitative (non-quantitative); quant = quantitative; PrVAP = Probable VAP; Path = pathology/histopathology; VAC = Ventilator-Associated Condition; IVAC = Infection-related Ventilator-Associated Complication; PoVAP = Possible VAP.

[a] ≥25 neutrophils per low power field (or heavy, 4+) and ≤10 squamous epithelial cells per low power field (or rare, occasional, few, 1+ or 2+)
[b] Endotracheal aspirate: quantitative threshold = ≥ 10^5 CFU/ml (or moderate-heavy, 2+-4+ growth); Bronchoalveolar lavage: quantitative threshold = ≥ 10^4 CFU/ml (or moderate-heavy, 2+-4+ growth); Lung tissue: quantitative threshold = ≥ 10^4 CFU/g (or moderate-heavy, 2+-4+ growth); Protected specimen brush: quantitative threshold = ≥ 10^3 CFU/ml (or moderate-heavy, 2+-4+ growth)
[c] Excludes the following, when cultured from sputum, ETA, BAL, PSB: Normal respiratory/oral flora, mixed respiratory/oral flora or equivalent, *Candida* species or yeast not otherwise specified, coagulase-negative *Staphylococcus* species, *Enterococcus* species. Exclusions do not apply to cultures of lung tissue or pleural fluid.
[d] Positive pleural fluid culture where specimen was obtained during thoracentesis or initial placement of chest tube and NOT from an indwelling chest tube; see protocol for guidance on positive lung histopathology; positive diagnostic test for Legionella spp. or for the following respiratory viruses: influenza virus, respiratory syncytial virus, adenovirus, parainfluenza virus, rhinovirus, human metapneumovirus, coronavirus

Ventilator-Associated Events (VAE) Antimicrobial Worksheet

Patient ID: _____ Date of Mechanical Ventilation (MV) Initiation: _____

VAE Day		-- (-4)	-- (-3)	Baseline (-2)	Baseline (-1)	**Event Date: VAE Day 1**	2	3	4	5	6	7	8	9	
Date (mm/dd)															
MV Day (1, 2, 3, etc.)															
List antimicrobials:	New?														
1															
2															
3															
4															
5															
6															
7															
8															**Total consec-utive QADs:**
9															
10															
Qualifying Antimicrobial Days (QADs)															

Are there at least 4 consecutive QADs, starting in the VAE Window Period?

☐Yes→meets IVAC, evaluate for Possible and Probable VAP

☐ No→does not meet IVAC, report as VAC

VAE Calculator

VAE Calculator

Ventilator Associated Event Calculator

Beta Ver. 0.48 Sept. 25, 2012

Calculate VAC | Start Over | Go to IVAC | Explain...

A Ventilator Associated Condition(VAC) was found on day 09/15/2012. Click on the Go To IVAC button to move to the next part of the protocol or click on the "Explain" button to see how this determination was made.

MV Day	Date	Min. PEEP (cmH_2O)	Min. FiO_2 (30 - 100)	VAE
7	09/12/2012	5	45	
8	09/13/2012	5	45	
9	09/14/2012	5	45	
10	09/15/2012	8	55	VAC
11	09/16/2012	8	55	
12	09/17/2012	8	45	
13	09/18/2012	6	50	
14	09/19/2012	5	50	
15	09/20/2012	5	50	
16	09/21/2012	5	40	

Legend: VAE Window VAE Date Qualifying Antimicrobial Day (QAD) Cumulative QAD

An initiative for the public health community, within the Informatics R&D Lab, supported by: Public Health Surveillance and Informatics Program Office (proposed) | Office of Surveillance, Epidemiology and Laboratory Services Centers for Disease Control and Prevention | Department of Health and Human Services. This initiative abides by the Disclaimer and Code of Conduct of the R&D Lab

Key Take-Home Points

- **Patient must be ventilated more than 2 calendar days.**
- **Patient must have ≥2 calendar days of stability or improvement of oxygenation followed by ≥2 calendar days of worsening oxygenation.**
- **Earliest date of event for VAE is mechanical ventilation day 3 (first day of worsening oxygenation).**
- **First possible day that VAC criteria can be <u>fulfilled</u> is mechanical ventilation day 4.**

More Key Take-Home Points

- **Event Date defines the VAE Window Period:**
  - 2 days before, day of and 2 days after the Event Date – 5 days
  - May be shorter if worsening occurs early in the course of ventilation
- **All other criteria (for IVAC, Possible VAP, Probable VAP) must be identified within the VAE Window Period.**
- **The "VAE clock" starts over again when …**
  - The patient begins a new episode of mechanical ventilation
  - A new event period starts (i.e., 14 days have elapsed since previous VAE Event Date)
  - The patient comes off of an excluded therapy (such as HFV or ECMO) and goes back on conventional mode of ventilation

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- **VAP Surveillance Definition Working Group**
- **Other subject matter experts**
- **HHS Office of Healthcare Quality**
- **CDC Prevention Epicenters**
- **CDC VALORI/draft sVAP project collaborators**
- **CDC/DHQP colleagues**

Please place tab here with the number and title 17. VAE Case Studies: Audience Response. Presentation should be double sided, black and white, and 2 slides per page.

Ventilator - Associated Event Case Studies

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Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
October 4, 2012

The following examples are for illustration purposes only and are not intended to represent actual clinical scenarios.

Case Study 1

A 69-year old female is seen in the ER and subsequently admitted to the ICU on a ventilator. Review her ventilator settings and determine if VAE criteria are met. If so, on what MV Day does the event occur?

MV Day	Daily minimum PEEP	Daily minimum FiO_2
1	8	100
2	6	50
3	5	50
4	6	40
5	6	60
6	6	60
7	5	60
8	5	60
9	5	60

A. Yes
B. No

Case Study 1 (cont'd)

What if the settings were as follows?

MV Day	Daily minimum PEEP	Daily minimum FiO_2
1	8	100
2	6	50
3	5	50
4	6	40
5	6	70
6	6	70
7	5	60
8	5	70
9	5	60

A. Yes
B. No

Case Study 1 (cont'd)

The patient eventually develops a fever and is started on antibiotics. Does this meet the IVAC definition?

MV Day	Daily minimum PEEP	Daily minimum FiO_2	Temp Min	Temp Max	WBC Min	WBC Max	ABX
1	8	100					None
2	6	50					None
3	5	50	37.6	38	4.8	4.9	None
4	6	40	38.6	38.9	5.6	5.8	None
5	6	70	39	39.0	5.6	5.8	None
6	6	70	38.8	39.0	5.1	5.4	None
7	5	60	38.0	38.1	5.2	5.4	None
8	5	70					Yes
9	5	60					Yes

A. Yes

B. No

Case Study 1 (cont'd)

Does this meet IVAC definition?

MV DAY	Daily minimum PEEP	Daily minimum FiO_2	Temp Min	Temp Max	WBC Min	WBC Max	ABX
1	8	100	37.1	37.2	4.6	4.7	None
2	6	50	36.8	37.1	4.8	4.8	None
3	5	50	37.6	38	4.8	4.9	None
4	6	40	38.6	38.9	5.6	5.8	None
5	6	70	39	39.0	5.6	5.8	None
6	6	70	38.8	39.0	5.1	5.4	Yes
7	5	60	38.0	38.1	5.2	5.4	Yes
8	5	70	37.0	37.9	5.2	5.4	Yes
9	5	60	37.6	37.9	4.8	5.0	Yes

A. Yes

B. No

Case Study 1 (cont'd)

Let's assume the same patient (VAE event date on MV Day 5) had an increase in sputum production on MV Day 6.

Sputum was collected for C&S same day.

On MV Day 8 the report came back: scant normal flora with many *Staphylococcus aureus.*

A. IVAC

B. Possible VAP

C. Probable VAP

Case Study 1 (cont'd)

MV DAY	Daily minimum PEEP	Daily minimum FiO_2	Temp Min	Temp Max	WBC Min	WBC Max	ABX	Specimen	Polys /Epis	Organism
1	8	100	37.1	37.2	4.6	4.7	None			
2	6	50	36.8	37.1	4.8	4.8	None			
3	5	50	37.6	38.0	4.8	4.9	None			
4	6	40	**38.6**	**38.9**	5.6	5.8	None			
5	6	70	**39**	**39.0**	5.6	5.8	None			
6	6	70	**38.8**	**39.0**	5.1	5.4	**Yes**	Sputum		**Scant NF, Many *S. aureus***
7	5	60	38.0	38.1	5.2	5.4	**Yes**			
8	5	70	37.0	37.9	5.2	5.4	**Yes**			
9	5	60	37.6	37.9	4.8	5.0	**Yes**			

Case Study 2

A 72 year old male is seen in the ER of Hospital A on May 2nd following a motor vehicle accident. He sustained closed rib fractures, ruptured spleen and dissection of the aorta.

In the ER, central lines and a Foley catheter were placed. He was admitted to Trauma ICU on that same day where he was intubated and stabilized at a PEEP setting of 6 cm H_2O and FiO_2 of 0.50 (50%).

On MV Day 4 he required an increase in PEEP to 7.5 cm H_2O and FiO_2 to 0.80 (80%).

Utilize the information on the table to evaluate for VAE(s) answer the following questions:

Case Study 2 (cont'd)

Does the patient meet criteria for a VAE ?

MV Day	$PEEP_{min}$	FiO_{2min}
1	6	50
2	6	50
3	6	50
4	7.5	80
5	7.5	80
6	7.5	75
7	6	75
8	6	75
9	6	60
10	8	80
11	8	80
12	6	60
13	6	60
14	6	60
15	6	60
16	7.5	85
17	7.5	85
18	7.5	85

A. Yes

B. No

Case Study 2 (cont'd)

Identify the Ventilator-Associated Event(s) and date(s) of the event(s) for this patient:

MV Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Speci-men	Polys / Epis	Organism
1	6	50					None	--	--	--
2	6	50					None	--	--	--
3	6	50	37.0	37.9	5.4	5.4	None	--	--	--
4	7.5	80	36.5	37.3	7.2	9.2	None	--	--	--
5	7.5	80	36.3	38.9	7.4	8.4	None	BAL	≥ 25 / ≤ 10	10^4 *Pseudo. aeruginosa*
6	7.5	75	37.2	38.5	8.5	8.8	Yes	--	--	--
7	6	75					Yes	--	--	--
8	6	75					Yes	Blood	--	*Pseudo. aeruginosa*
9	6	60					Yes	--	--	--
10	8	80					Yes	--	--	--
11	8	80					Yes	--	--	--
12	6	60					Yes	--	--	--
13	6	60					Yes	--	--	--
14	6	60					Yes	--	--	--
15	6	60					No	--	--	--
16	7.5	85					No	--	--	--
17	7.5	85					No	--	--	--

Case Study 2 (cont'd)

Identify the Ventilator-Associated Event(s) for this patient:

A. IVAC MV Day 4

B. Possible VAP MV Day 4

C. Probable VAP MV Day 4 and VAC MV Day 16

D. Probable VAP MV Day 4

Does this patient develop a secondary bloodstream infection?

A. Yes

B. No

Case Study 3

A 56-year old male is taken directly to the Operating Room from the Cath Lab following arrest during angioplasty procedure.

Quadruple bypass procedure is performed and he remains on the ventilator following surgery (MV Day 1). He has a central line and a Foley catheter in place when he arrives in the ICU that same day.

Case Study 3 (cont'd)

Identify the event(s) and date(s) of event(s) that occur for this patient?

MV Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Specimen	Polys / Epis	Organism
1	6	30	37.1	37.6	4.3	4.3	None	--	--	--
2	6	30	36.8	37.2	4.6	4.6	None	--	--	--
3	6	30	37.0	37.9	5.4	5.4	None	--	--	--
4	8	30	36.5	37.3	7.2	9.2	None	--	--	--
5	8	35	36.3	37.2	7.4	12.5	None	BAL	≥ 25 / ≤ 10	10^4 *Enterococcus*
6	8	50	37.2	37.9	8.5	13.0	Yes	--	--	--
7	6	50	37.8	37.3	--	--	Yes	BC x2	--	*Enterococcus*
8	6	40	37.2	37.9	--	--	Yes	--	--	--
9	6	40	37.5	37.9	9.7	11.7	Yes	--	--	--
10	8	40	37.4	37.1	9.6	10.9	Yes	--	--	--
11	8	40	37.2	37.9	9.4	9.4	Yes	--	--	--
12	6	30	37.3	37.5	9.5	9.5	Yes	--	--	--
13	6	30	37.2	37.8	8.2	8.2	None	--	--	--
14	6	30	37.0	37.7	8.6	8.6	None	--	--	--
15	6	60	37.2	37.9	9.4	12.1	Yes	--	--	--
16	7	60	37.3	37.5	13.0	13..5	Yes	--	--	--
17	7	85	37.2	37.8	--	---	Yes	--	--	--
18	7	85	37.0	37.7	--	--	Yes	--	--	--

Case Study 3 (cont'd)

Identify the event(s) that occur for this patient:

A. MV Day 6 - Probable VAP

B. MV Day 6 - Possible VAP

C. MV Day 15 - IVAC

D. MV Day 15 - Probable VAP

Case Study 3 (cont'd)

If there had been documented worsening on MV day 5 and 6 would criteria for Possible or Probable VAP have been met?

MV Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Specimen	Polys / Epis	Organism
1	6	30	37.1	37.6	4.3	4.3	None	--	--	--
2	**6**	**30**	36.8	37.2	4.6	4.6	None	--	--	--
3	**6**	**30**	37.0	37.9	5.4	5.4	None	--	--	--
4	**6**	**30**	36.5	37.3	7.2	9.2	None	--	--	--
5	**8**	50	36.3	37.2	7.4	**12.5**	None	**BAL**	**≥ 25 / ≤ 10**	**10^4 *Enterococcus***
6	**8**	50	37.2	37.9	8.5	**13.0**	**Yes**	--	--	--
7	**6**	**40**	37.8	37.3	--	--	**Yes**	BC x2	--	*Enterococcus*
8	**6**	**40**	37.2	37.9	--	--	**Yes**	--	--	--
9	6	**40**	37.5	37.9	9.7	11.7	**Yes**	--	--	--
10	8	40	37.4	37.1	9.6	10.9	Yes	--	--	--
11	8	40	37.2	37.9	9.4	9.4	Yes	--	--	--
12	6	30	37.3	37.5	9.5	9.5	Yes	--	--	--
13	6	30	37.2	37.8	8.2	8.2	None	--	--	--
14	6	30	37.0	37.7	8.6	8.6	None	--	--	--
15	6	60	37.2	37.9	9.4	12.1	Yes	--	--	--
16	7	60	37.3	37.5	13.0	13..5	Yes	--	--	--
17	7	85	37.2	37.8	--	---	Yes	--	--	--
18	7	85	37.0	37.7	--	--	Yes	--	--	--

Case Study 4

42 year old female dialysis patient was intubated and transferred from Hospital A to Hospital B on MV Day 1 for management of severe asthma exacerbations.

The patient had been receiving vancomycin for treatment of BSI.

Upon admission her temperature was 37.5^{0}C and WBC 5.6.

Case Study 4 (cont'd)

On MV Day 3 during dialysis treatment the patient developed a temperature of 39.7^{0}C.

On MV Day 5 she had increased respiratory secretions and an endotracheal aspirate was sent for culture and Gram stain.

On MV Day 7 imipenem was started.

Case Study 4 (cont'd)

MV Day	PEEP min	FiO_2 min	Temp min	Temp max	WBC min	WBC max	Abx	Specimen	Polys / Epis	Organism
1	6	50	37.0	37.5	4.3	5.6	Vanco	--	--	--
2	5	40	37.0	37.2	--	--	None	--	--	--
3	6	40	37.2	39.7	--	--	Vanco	--	--	--
4	6	60	37.9	39.7	--	--	None	--	--	--
5	6	60	36.3	39.9	--	--	Vanco	ETA	≥ 25 / ≤ 10	Heavy *K. pneumoniae*
6		60	37.2	39.8	--	--	None	--	--	--
7	6	60	37.8	37.3	--	--	Imipenem	--	--	--
8	5	60	37.2	37.9	--	--	Imipenem	--	--	--
9	5	55	38	38	--	--	Imipenem			
10	6	60	37.9	37.9	--	--	Imipenem	--	--	--

Case Study 4 (cont'd)

Does this patient meet criteria for VAE, and if so, what type of VAE?

A. VAC

B. IVAC

C. Possible VAP

D. No VAE

Case Study 5

A hospitalized 78 year-old male returned from the operating room on a ventilator following ventral hernia repair (MV Day 1).

On MV Day 4 the ventilator is removed at 1600 hrs.

The next calendar day (MV Day 5) he coded and was re-intubated at 1730 hrs.

The following day (MV Day 6) he develops a fever, and WBC count increases to 14.2. Cefepime is started and continued for 1 additional day, and then the patient is switched to piperacillin/tazobactam.

MV DAY	PEEP Min	FiO_2 Min
1	5	50
2	5	50
3	5	40
4	5	40
5	5	70
6	5	70
7	5	60
8	5	50
9	5	45
10	5	45

Case 5 (cont'd)

MV DAY	PEEP Min	FiO_2 Min	WBC	Temp	Antibiotic
1	5	50			
2	5	50			
3	5	40			
4 (extubated)	5	40			
5 (re-intubated)	5	70			
6	5	70	14.2	↑	Cefepime
7	5	60			Cefepime
8	5	50			Pip/Tazo
9	5	45			Pip/Tazo
10	5	45			Pip/Tazo

Case Study 5 (cont'd)

Based on the provided information, which of the following represents his VAE status?

A. IVAC, MV Day 5

B. VAC, MV Day 5

C. IVAC, MV Day 6

D. No VAE

Case Study 6

A 30 year-old female with a history of cerebral palsy, seizures and diabetes was admitted to MICU with respiratory failure.

She was ventilated on admission and stabilized.

On MV Days 3-6 her PEEP was stable at 4 cm H_20. On MV Day 7 her min PEEP was 8 cm H_20 and remained at 8 for the next 5 days.

A fever of 40.1^{o} C was documented on MV Day 8 and 9 and antibiotics were started on MV Day 9 and continued until MV day 15.

Case Study 6 (cont'd)

On MV Day 8 an endotracheal aspirate (ETA) was collected. Gram stain revealed many neutrophils, rare epithelial cells, many gram positive cocci, few yeast and many gram negative rods.

The laboratory's semi-quantitative evaluation of this gram stain was indicative of purulent respiratory secretions.

On MV Day 9 a bronchoscopy was performed at which time a trans-bronchial biopsy (TBBx) was collected. The biopsy subsequently was reported to be growing *Candida albicans* $\geq 10^4$ cfu/g.

How would you report these findings in NHSN?

Case 6 (cont'd)

MV DAY	PEEP Min	FiO_2 Min	Temp	ABX	Speci-men	Polys/ Epis	Organism
1	6	40					
2	5	40					
3	4	30					
4	4	30					
5	4	30					
6	4	30					
7	**8**	35					
8	8	60	40.1		ETA	Many/ Rare	
9	8	60	40.1	Yes	TBBx		*C. albicans* $\geq 10^4$
10	8	60		Yes			
11	8	55		Yes			
12	8	35		Yes			

Case Study 6 (cont'd)

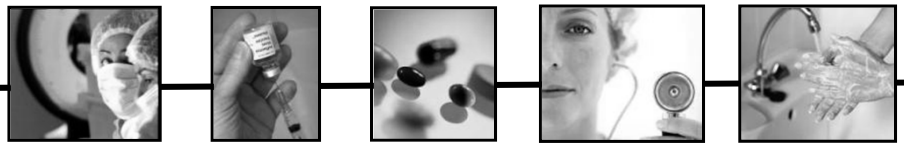
A. Possible VAP, MV Day 7

B. Probable VAP, MV Day 7

C. IVAC, MV Day 7

D. No VAE

Please place tab here with the number and title 18. Keeping the Public's Trust.
Presentation should be double sided, black and white, and 2 slides per page.



Keeping the Public's Trust:

How to Communicate about NHSN Data and HAI Prevention

Abbigail Tumpey, MPH CHES
Associate Director for Communications Science
Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention

Communication Landscape

- **HAIs generate significant press**
  - Shift to regional or local focus
- **Wide and varied audiences**
  - Need for reaching a broad healthcare team
- **Our science is complex**
  - Topics are difficult for consumers to grasp
- **Numerous prevention recommendations**
  - No one behavior can prevent all HAI threats
- **Need for strong risk communications**
  - Patients may feel variety of feelings: fear, loss of trust, lack of control

Objectives for HAI Communications

- **Increase patients' and caregivers' awareness around healthcare-associated infections**
- **Educate healthcare providers on best practices to prevent HAIs in all healthcare settings**
- **Improve transparency and accountability around reporting of medical errors**

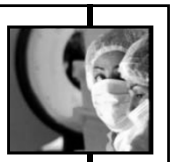
Communication Science: *Myths vs. Actions*

Myths	***Actions***
Telling the public about a risk is more likely to cause undue alarm	Decrease the potential for alarm by giving people a chance to express concerns
We shouldn't go to the public until we have the problem solved	Discuss information about prevention programs early and involve consumers in the process
Consumer advocates stir up unwarranted concerns	Patient advocates help focus public attention that can even result in increased resources for IP programs. Work with them rather than against them.
HAIs are too difficult for the public to understand	Focus on delivering clear communication!
Risk communication is not my job	**Effective communication is valuable for everyone in healthcare. You can play a unique role in leading this effort within your institutions and at the bedside.**

Best practices in communication

- Select specific audiences for messages
  - Audience segmentation
- Learn from audiences and shape messages for them with their input
  - Formative evaluation
  - Working with consumers
- Use what we know about behavior
  - Behavior theory
  - Example: if you are tackling a healthcare provider behavior, use observation.
- Use multiple channels to reach audiences and to repeat messages
  - Optimizing exposure to messages
  - Frequency of the message can reinforce the behavior
- Build in feedback loops
  - What are audiences hearing?
  - How are they responding?

We will discuss how to…



- **Maintain trust with your patients, public, policymakers, and media**

- **Ensure accountability – improving communications around public reporting of HAI data**

- **Engage consumers toward infection prevention efforts**

- **Enhance transparency – what to do when things go wrong?**
  - Patient notification events

BEING ACCOUNTABLE

Improving communications around public reporting of HAI data

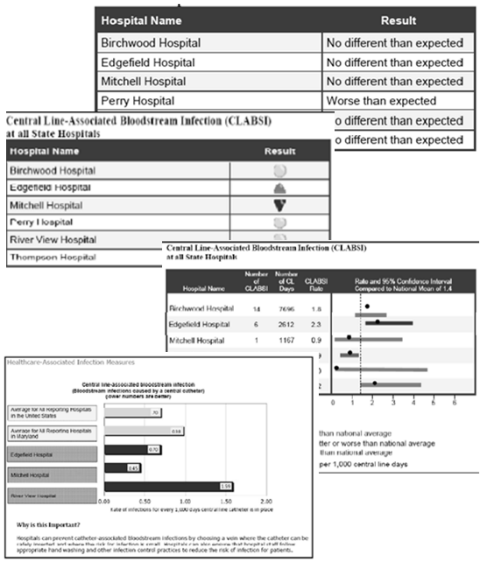
Changing landscape of HAI public reporting

- **28 states and D.C. have public reporting laws**
- **CMS requirements are impacting facilities nationwide:**
  - Hospitals
  - Dialysis facilities
  - Long term acute care hospitals
  - Inpatient rehabilitation facilities
  - Acute care hospitals
  - Outpatient surgical centers

We all need to be able to explain HAI data!

Limited data on patient's understanding of infection reporting

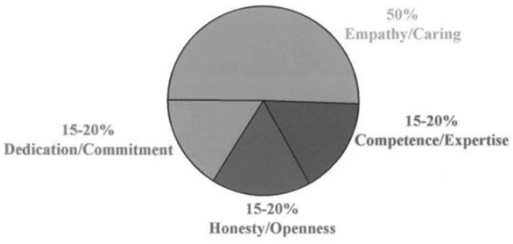
- **Limited assessment of what patients understand from publicly reported infection data**
- **Focus groups done by HHS Region VI**
  - Tested 6 examples of publicly reported data that is currently being used
  - Preference for data as displayed on CMS' *Hospital Compare* or combination of numbers and symbols
  - Mixed responses on how data would influence decision making
  - Full analysis and report being written
- **What you can do**
  - Release information simultaneously with data releases to frame the story for your facility, organization, or system



Need to maintain and build trust and credibility within your community

- **When communicating on infection data, maintaining trust is critical**
- **Risk communication literature identifies 4 factors that determine whether the public will perceive a messenger as trusted and credible**
  1. Empathy and Caring
  2. Honesty and Openness
  3. Dedication and Commitment
  4. Competence and Expertise

Trust and Credibility Factors



Navy Environmental Health Center Risk Communication Primer: http://www-nehc.med.navy.mil/downloads/deployment_health/primer.pdf

Seven Rules for Maintaining Trust

1. **Stop digging**
   The first thing to do when you are stuck in a hole: stop digging. Overconfidence or over-reassurance makes the credibility hole deeper.
2. **Acknowledge the situation**
   If you don't acknowledge the situation, people will think you are not aware and then they will start rumors.
3. **Empathize and even apologize**
   Never let your efforts prevent your acknowledging the tragedy of an illness, injury, or death.
4. **Listen to and legitimize the public's concerns**
   Your goal is to produce an informed public, not to defuse public concerns or replace actions.
5. **Ensure transparency**
   Be honest, frank, and open. Trust and credibility are difficult to obtain; once lost, they are almost impossible to regain.
6. **Set up accountability mechanisms**
   Let people know what you will do to address the issue and how you will report progress.
7. **Forecast new emerging problems on the horizon**
   Anticipate future patient safety channels and how you are going to address them.

What you can personally do to win and keep public trust

- **Always do your homework**
  - Advance of public release of data
    - Pull your infection data; Brief individuals up the chain to ensure no surprises
    - Assess who else you should communicate with in the state
    - Engage consumers in advance
    - Develop a communication strategy
- **Dialogue as much as possible**
  - Communicate in a proactive manner
  - A communication vacuum can lead to escalating rumors
- **Be transparent wherever possible**
- **Messages must address emotional responses**
  - Expect a variety of emotional and practical responses from consumers
  - Empathy, caring, honesty, openness, dedication are key!

Communicating with the Public
Avoiding Pitfalls

Topic	Do…	Don't…
ACRONYMS	Define all technical terms and acronyms	Use language that may not be understood by even a portion of your audience
NEGATIVE ALLEGATIONS	Refute the allegation without repeating it	Repeat or refer to the negative allegation
RELIANCE ON WORDS	Use visuals to emphasize key points	Rely entirely on words
TEMPERMENT	Remain calm. Use a question or allegation as a springboard to say something positive	Let your feelings interfere with your ability to communicate positively
CLARITY	Ask whether you have made yourself clear	Assume you have been understood
ABSTRACTIONS	Use examples or analogies to establish a common understanding	Assume that people understand the complexity of HAIs

Communicating with the Public
Avoiding Pitfalls

Topic	Do…	Don't…
PROMISES	Promise only what you can deliver. Set and follow strict deadlines.	Make promises you can't keep or fail to follow through on promises made.
MONEY	Refer to the importance you attach to health and safety; remember your moral obligation to public health outweighs financial considerations.	Refer to the amount of money spent as a representation of your concern. Allow cost to get mixed into a conversation associated with patient safety.
RISK	Give your best estimation, based on the science, on the risk (especially associated with infection control lapses).	State absolutes or expect the lay public to understand risk numbers.
BLAME	Take responsibility for your share of the problem; use empathy.	Try to shift blame or responsibility to others.
NUMBERS	Emphasize performance, trends, and achievements. Explain what you are going to do to improve, especially if the numbers are bad.	Turn the conversation into an attack on the accuracy of the numbers, the system, or place blame elsewhere.

ENGAGING CONSUMERS

Engaging consumers is critical

- **External viewpoint always beneficial**
  - Get feedback on messages and communication efforts
  - Ensure that what we are embarking on makes sense to people outside your inner circle
  - Verify that the actions we are taking are appropriate given the risk
  - Cooperation increases credibility
- **To the extent possible, involve consumers in the decision-making process**
  - Engage early and clarify their role
  - Acknowledge situations where input is heard, but may not always be acted upon
- **REMEMBER -- At the end of the day, we all want the same thing – *Patient Safety!***

How CDC started working with patient advocates

- Regular conference calls with patient advocates
- Collaborations on topic-specific projects
- Specific calls to explain our science as embargos lift
- Held first "Conversation with Consumers" at CDC in June 2010

Response from Consumer Meeting – Blog Quotes

Safe Patient Project — Consumers Union

End secrecy, save lives.

ACT NOW | TOPICS | BLOG | SHARE YOUR STORY | VIDEO | TWITTER | ABOUT US

The Dirty Truth: Spread the Word, not the Germ

Patient safety activists hold "conversation" with CDC

Share Email Print

Posted by Daniela at 07/02/10 06:02 PM

On June 16, Consumers Union's Safe Patient Project and 11 patient safety advocates from 10 states attended the first "Consumer Conversation on Healthcare-Associated Infections" at the Centers for Disease Control and Prevention (CDC) in Atlanta. The goal of this day-long meeting was to discuss hospital infection issues and how consumers and CDC can work together to eliminate them.

And we had interactive discussions with CDC experts about their website, educational materials for consumers, multi-drug resistant organisms (C.diff, MRSA, gram-negative infections), the Recovery Act and funds going to the states on reducing hospital infections, tracking and reporting hospital infections, and medical harm in outpatient settings (ambulatory surgical centers, nursing homes, etc.). Consumers confronted agency staff with their concerns about various issues, including the agency's guidelines on preventing MRSA infections and the lack of high profile attention to this problem that affects 2 million hospital patients every year.

Kathy Day, a patient safety advocate from Maine who attended the meeting, wrote in her blog: "Never in my wildest dreams did I expect to be sitting in a conference room, having a 'conversation' with top ranking CDC physicians and others, and confidently and repeatedly expressing my personal and profession opinion on MRSA control."

All of these advocates have been working on the front lines in their states for infection prevention and hospital accountability to pass public reporting laws. As leaders of patient safety nonprofit organizations and committee members for state hospital infection advisory groups, these individuals brought personal experience and expertise about medical harm to the CDC. The CDC hears from hospitals, doctors, and health care administrators year-round, which is why this consumer meeting marked a critical moment for starting an honest, productive conversation with them about hospital-acquired infections beyond the statistics and the data, and we of course value that information too.

The availability of hospital infection rates --which motivates hospitals improve their prevention efforts--was brought upon by a consumer movement lead by Consumers Union and advocates working together in the states. As our Campaign Director Lisa McGiffert wrote in her guest blog for the CDC, our efforts over the past 7 years have changed the health care environment where safety improvements became a must. In February, the CDC officially endorsed public reporting as a way to eliminate hospital infections, and consumers deserve credit for stimulating these changes.

CDC and activists intend this hospital infection conversation to be ongoing in order to support the CDC's efforts on infection prevention and for the CDC to incorporate consumers perspectives moving forward.

For visual evidence of this meeting and to learn more about these advocates and their work on hospital infections, visit our Flickr photo album here.

"Never in my wildest dreams did I expect to be sitting in a conference room, having a 'conversation' with top ranking CDC physicians and others…"

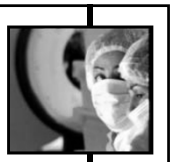
"…the CDC is becoming more consumer friendly."

"It was wonderful to hear the CDC officials saying that ELIMINATION is their goal."

"CDC and activists intend this hospital infection conversation to be ongoing in order to support the CDC's efforts on infection prevention and for the CDC to incorporate consumers perspectives moving forward."

Engaging a patient advocate

- **Start local – look for advocates who are outside your healthcare system but in the vicinity**
- **Groups you can tap for assistance**
  - Consumers Union or other patient safety groups
  - State HAI Advisory Board (most have a patient advocate)
- **Initial face-to-face meeting to establish plan for working relationship**
- **Regular conference calls (monthly) and periodic face-to-face meetings (quarterly)**
- **Items to discuss:**
  - Progress on prevention collaboratives
  - New initiatives
  - Communicating with patients and the community
  - Public reporting of infection data




ENHANCING TRANSPARENCY

Patient notification events -- what to do when things go wrong?

LIVING IN FEAR

Patients in hepatitis C case brace for fateful results

After years of arthritis treatments that have left Pat Criscito's immune system in tatters, she said a positive test for hepatitis C after surgery last fall at Rose Medical Center would have been a death sentence. She learned Wednesday that her test was negative. *Joe Amon, The Denver Post*

Factors Influencing Risk Perception

Perceptions of risk are influenced by many factors, not just numerical data

More accepted risks:
Those perceived to…

- Be voluntary
- Be under an individual's control
- Have clear benefits
- Be natural
- Be generated by a trusted source
- Be familiar
- Affect adults

Less accepted risks:
Those perceived to…

- Be imposed
- Be controlled by others
- Have little or no benefit
- Be manmade
- Be generated by an untrusted source
- Be exotic
- Affect children

Fischhoff et al. 1981

Coming Soon: Patient Notification Toolkit

- **Provides communication assistance to local/state health departments, healthcare facilities, and others**
  - Example letters
    - Sample letter with no disease transmission identified
    - Sample letter with disease transmission identified
    - Sample letter for primary healthcare provider notification of testing recommendations
    - Sample patient test results letter (for negative results)
  - Planning for media
    - Writing messages, spokesperson prep, etc.
    - Example press releases and media fact sheets
  - Call center support
    - How to set up your call center
    - Questions and answers for call centers
  - Risk communication expertise

Website Resources

- A Primer on Health Risk Communication Principles and Practices:
  - http://www.atsdr.cdc.gov/risk/riskprimer/index.html
- Visit CDC On-line:
  - www.cdc.gov/hai
- CDC's Safe Healthcare Blog
  - http://www.cdc.gov/safehealthcare
- CDC's Expert Commentary Series on Medscape
  - http://www.medscape.com/partners/cdc/public/cdc-commentary

Take Away Points

- **Plan early**
  - Engage partners and build relationships before a crisis
- **Be transparent**
- **Communicate often**
- **Listen and be compassionate in your messaging**
- **Include patient advocates, your audience, in your planning efforts**
- **Focus on clear language**
- **Learn from others on what worked**

Questions?

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For more information please contact Centers for Disease Control and Prevention
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